VOTING AS A HABIT? QUANTITATIVE ANALYSES OF VOTING COSTS AND TURNOUT IN DIRECT DEMOCRACY

Thesis (cumulative thesis)
presented to the Faculty of Arts and Social Sciences
of the University of Zurich
for the degree of Doctor of Philosophy

by
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Accepted in the spring semester 2016
on the recommendation of the doctoral committee:

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Zurich, 2017

Abstract

English

There seems to be almost no disagreement on findings that voting behavior is persistent in electoral democracies. In the first study, using a unique data set from the Swiss canton of Geneva, we investigate whether turnout in the direct democratic context follows the same pattern or obeys to a different logic than electoral turnout. We find strong evidence that voting is also persistent in direct democracy.

In the second study, I investigate whether voting costs reduction in form of postal voting leads to higher participation rates. Understanding the effect of postal voting on turnout is relevant, as one of the main motivations behind this electoral reform was the hope that it would make the voting system more inclusive, hence increase the participation among citizen. The study fails to find evidence in support of the conventional view that making voting easier always leads to higher turnout rates.

In the third study, I investigate whether turnout decisions become habitual and, if so, how fast? The habituation thesis is based on the idea that behaviors become routine once they have been performed a number of times. The results show that there is indeed an element of inertia in turnout that is probably due to habit-forming effects of voting behavior. However, habit formation seems to operate differently among typical voters and non-voters.

Deutsch

Die bis jetzt publizierten Studien, teilen mehrheitlich die Erkenntnis, dass das Wahlverhalten in den Wahldemokratien persistent ist. In der ersten Studie wird mit Hilfe einzigartiger Daten aus dem Kanton Genf untersucht, ob die Stimmbeteiligung in einem direktdemokratischen Kontext demselben Muster folgt wie in der Wahldemokratie. Wir finden starke Hinweise dafür, dass die Abstimmung auch in der direkten Demokratie persistent ist.

In einer zweiten Studie wird untersucht, ob eine Kostenreduktion in Form der Briefwahl bei Abstimmungen zu einer höheren Stimmbeteiligung führt. Das Verständnis der Wirkung der Briefwahl auf die Stimmbeteiligung ist wichtig, da die Hauptmotivation hinter dieser Wahlreform die Hoffnung auf ein inklusiveres Wahlsystem war, welches die Beteiligung der Bürger erhöhen würde. Die Befunde der Studie liefern keine Hinweise, dass eine Kostenreduktion bei Abstimmungen immer zu einer höheren Stimmbeteiligung führt.

In der letzten Studie wird untersucht, ob die Stimmbeteiligung eine Angewohnheit werden kann. Die Gewöhnungs-These basiert auf der Idee, dass Wahlverhaltensweisen Routine werden können, nachdem sie genügend oft wiederholt werden. Die Ergebnisse zeigen, dass es tatsächlich ein Element der Trägheit in der Stimmbeteiligung gibt, das vermutlich auf gewohnheitsbildende Effekte des Wahlverhaltens zurückzuführen ist. Allerdings scheint die Gewohnheitsbildung unter den typischen Wählern und Nichtwählern unterschiedlich zu funktionieren.

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Acknowledgments

First and foremost, I would like to thank my advisor, Prof. Dr. Marco R. Steenbergen, for his constant support throughout my Ph.D. project. He has offered me so much advice, patiently supervising my work, and always guiding me in the right direction. He is one of the most benevolent persons I have ever known. He is a brilliant teacher and scientist: I have learned a lot from him and without his sincere support, I would have not been able to finish this project.

I also would like to sincerely thank my second supervisor, Prof. Dr. Peter Selb, for his insightful thoughts regarding my Ph.D. proposal and for giving me very valuable advice and suggestions how to shape this project.

I am also thankful to Dominik Hangartner and Christian Rubba for their helpful comments on all parts of this dissertation. During the past years I have had great colleagues and friends at the IPZ, in particular, Nino Abzianidze, Karima Bousbah, Zarina Burkadze, Heiri Gander, Miriam Hänni, Livio Raccuia, Thomas De Rocchi, Benjamin Schlegel, and many more. I thank them all for their support and valuable comments during seminars and workshops, but also for all the fun we had. I also thank Lineo Devecchi for accepting the role of the official observer during my Ph.D. defence.

I am deeply grateful to Elaine Sieff for her effortless help in correcting the English of my papers and making them a better read.

I am especially grateful to my parents, Rema and Kadër, as well as to my sister, Njomza, and brother, Rrezart Veseli. We are a great family and I thank them so much for always being there for me. My mom took three months of her time to help us raise our newly born son, Vincent, only so I can finish this Ph.D. project. My father is one of the most optimistic persons one can find: when I had difficulties he was always there to support me with his optimistic attitude and everything else he had.

I also thank my broader family for their support. Especially, I am thankful to my cousins Alban and Lorik Fetahu for so many memorable times together in the past. I am sure, we will continue to have great times in the future as well. I shall always appreciate the close friendship we have.

Finally, I would like to thank from the depth of my heart, my wife, Justina Veseli, for her love, patience, and understanding. Without her constant support, finishing this project would have been an impossible task. I also want to thank my son, Vincent Veseli, for all the joy he has brought in my life. He is — by far — the best thing that has ever happened to me.

1

Introduction

In a democratically governing system, citizens can express their will and create expectations toward their government through the mechanism of elections, and in some countries additionally through referendums and initiatives. In this spirit, the participation of the citizens in political life by making use of their right to vote plays a vital role in the metabolism of democracy.

It is increasingly difficult, however, to ignore the constant decrease in voter turnout rates in most democracies over the last fifty years. This creates a worrying trend because a fair, functional and sustainable democratic system exists only to the extent that policy outcomes mirror the will of eligible voters. Low turnout rates can result in serious implications for all political processes involving citizen participation, as they are reflected by the possibility of citizens' will being distorted in these processes.

In representational democracies, low turnout rates, although, far from being harmless, are expected to have a less negative effect on the quality of the democracy. Decision-making processes in this system involve various political actors and institutions and policy proposals make their way through different legislative and executive procedures before they reach the final form (Birch, 2009; Hurley and Hill, 2003; Martin, 2003). Low participation rates may be particularly problematic, however, in the direct democratic context, as decisions made in referendums and initiatives have an immediate and direct effect on policy outcomes. If a considerable group of the eligible voters constantly fails to participate in the decision-making process, then the legitimacy of direct democratic procedures may be undermined.

In the future, more and more countries are expected to introduce direct democratic tools. For example, in creating the Treaty of Lisbon, effective as of 2009, the European Union established a legal basis allowing citizens to propose initiatives. Thus, these prominent direct democratic elements, such as the referendum and initiative, are becoming more and more popular also outside Switzerland. Referendums have already taken place in Germany, Chile, Uruguay, Brazil, Canada, South Africa, etc. (see Christmann and Solar, 2013; Butler and Ranney, 1994; Hug, 2004; LeDuc, 2002)[1]. Hence, it is of considerable importance to study turnout in the direct democratic context. Clarifying different factors that help to better understand participation dynamics is also relevant for the case of Switzerland, for Switzerland has a long tradition of direct democracy, usually characterized by very low turnout rates (see Linder, Bolliger and Rielle, 2010).

The trend toward more direct democracy notwithstanding, many aspects of participation dynamics in the direct democratic context remain understudied. In contrast to

[1]However, of all democracies in the world, Switzerland has the most far-reaching direct democratic elements.

the volume of literature on the participation dynamics in representative democracies, only a very small body of literature studies these effects in the direct democratic context. As a consequence, we know very little about participation in direct democracy, i.e., in referendums and initiatives. With direct democratic institutions becoming ever more prominent — and hopes for these institutions often being extremely high — we should take the participation in the direct democratic context seriously. Thus, there is undoubtedly a need for more studies in this field and the aim of this Ph.D. project is to help fill this void. The main objective of this thesis is to provide a more comprehensive assessment of turnout in direct democratic context by exploring *a)* whether voting behavior is persistent, *b)* whether voting costs reduction in form of postal voting leads to higher participation rates, and *c)* whether turnout decisions become habitual under certain circumstances. Concretely, this Ph.D. project contributes to the existing literature with three studies on voter participation in the direct democratic context.

The motivation for the second chapter stems from the literature on turnout dynamics in electoral democracies. There seems to be almost no disagreement on findings that voting behavior is persistent. Hence, voting in $t-1$ increases the propensity to participate at t, all else equal. But, given the particularities of the voting mechanisms in the direct democracy, does this generalization hold true also to direct democratic votes? To date, almost all of the existing research regarding persistence in turnout pertains to electoral research.[2]

Using a unique data set from the Swiss canton of Geneva and focusing on eligible first-time voters and their subsequent turnout behavior, we investigate whether turnout in the direct democratic context follows the same pattern or obeys to a different logic than electoral turnout. From one perspective, it may seem obvious that the persistence

[2]For a partial exception see Serdült (2013).

in voting behavior is extendable to direct democracy, for persistence thesis basis on the idea that past behaviors tend to reinforce themselves also in the future. Hence, there is no reason to believe that this may not hold true for participation in direct democratic votes as well. From another perspective, however, it is not so obvious why persistence in voting behavior should extend to direct democracy, where the issue salience wildly fluctuates across referendums and initiative. In the electoral context elections are generally important and their salience is rather stable over time, hence it is reasonable to assume that participation at $t-1$ is a good predictor of participation at t. This, however, can be different in the direct democratic context. Participating in a high salient referendum or initiative at $t-1$ may not predict well the propensity to participate in the subsequent occasion, which may happen to be a very low salient vote. Thus, it would be entirely reasonable for citizens not to let their turnout decision be guided by the past.

Notwithstanding the particularities in the nature of participation in direct democratic votes, the turnout dynamics there seem to have more in common with those in electoral turnout than previously thought. We find strong evidence that voting is also persistent in direct democracy. Indeed, the effect for direct democratic votes seems to be on the same level as that for votes for political office. Also in the Swiss context itself, the study shows no clear evidence that persistence in voting behavior plays out differently for referendums/initiatives and elections for political office. This underlines the importance of persistence in voting behavior as a general explanation of voter turnout.

While the second chapter was motivated by the consistency of the findings with regard to an attribute of turnout dynamics, the third chapter finds the motivation in the incongruity of the exiting literature concerning the effect of voting cost reduction on turnout.

The third chapter seeks to answer the question, whether the reduction of voting costs, more precisely, the introduction of voting by post in Swiss cantons, alters the turnout rates. Understanding the effect of postal voting on turnout is relevant, as one of the main motivations behind this electoral reform was the hope that it would make the voting system more inclusive, hence increase the participation among citizen. Furthermore, in the strive towards adopting to current trends in technology, the Swiss cantons of Geneva, Neuchatel, and Zurich have even introduced pilot projects allowing for a restricted group of persons to vote via the Internet. While in Switzerland postal voting is unrestricted and optional, the U.S. States of Colorado, Oregon, and Washington have moved to an all-mail-voting system, where going to the polling station is not an option anymore. Considering that there are efforts being made to further reform the balloting system by introducing internet voting and that the empirical evidence with respect to postal voting effects on turnout is inconclusive, it is of considerable importance to further investigate the implications of postal voting on turnout.

So, does the introduction of postal voting increase turnout? At first glance it seems logical that it should. As a result of optional postal voting it becomes possible to cast the ballot from the comfort of home, thus reducing the costs citizens associate with the act of voting itself. On the other hand, however, it is not so clear as to why postal voting should have an impact on turnout. The bulk of the voting costs are attributable to cognitive efforts of voting. One needs to gather and then process the information about the vote issues at hand; given the frequency of the voting occasions in Switzerland, the cognitive costs of dealing with all the different issues are considerable. If the cognitive costs of voting remain unchanged, there is no compelling reason to believe that allowing citizens to vote also per post will boost the turnout rates.

Although, the literature on postal voting has acquired an impressive following, one

limitation of the existing literature to date is that it has focused, with few exceptions, solely on the U.S. case.[3] Two studies have already investigated the effect of postal voting in Switzerland, however, they delivered opposite conclusions as to how postal voting affects turnout.[4] This brings me to the second limitation of the postal voting literature: the existing studies report wildly fluctuating effects of postal voting on turnout, ranging from a low of -13.2 to a high of 26.5 percentage points.[5] In light of these inconclusive findings, there is need for more research on this matter.

Utilizing the staggered implementation of postal voting in Swiss cantons, I use two different identification strategies in order to uncover the effect of postal voting on cantonal level turnout. Results from a synthetic control method analysis show that participation levels in Basel-Landschaft and St. Gallen did not increase after the introduction of postal voting in 1978 and 1979, respectively. Similarly, results from a regression discontinuity analysis indicate no positive shift in cantonal level turnout after the implementation of optional postal voting. In a nutshell, the study fails to find evidence in support of the conventional view that making voting easier always leads to higher turnout rates.

The last chapter of this Ph.D. project takes a deep look into the dynamic patterns of change and continuity in individual level participation. Specifically, it investigates whether turnout decisions become habitual and, if so, how fast. This chapter also explores possible differences in the pace of habit-formation among typical voters and non-voters.

Also in this case, almost all of the existing literature on habituation pertains to the electoral context. In my opinion, previous studies have interpreted their findings regard-

[3]For an exception see Rallings, Thrasher and Borisyuk (2010).
[4]See the studies of Luechinger, Rosinger and Stutzer (2007) and Funk (2010).
[5]See, for example, the studies of Bergman and Yates (2011) and Karp and Banducci (2000).

ing the question of habituation in turnout, too ambitiously. In electoral democracies elections take place on average every two years. Correspondingly, to date, the existing studies have been able to consider only about 2-3 time points when they investigated habituation in voting behavior. So few time points are deemed too short to determine any habit-formation effects, as behaviors tend to become routine only once they have been performed a considerable number of times. Thus, the frequency of the repetition of a same behavior in the same context plays an essential role in the habit-formation process (see Lally et al., 2010). The notion that citizens will acquire any participation habits after repeating the same voting behavior 2 or 3 times over a time span of many years is implausible. In my opinion, it is unclear whether habituation is the correct term to be used in studies that pertain to the electoral context, at all.

In Switzerland, citizens are called to cast their ballot much more often than it is the case with electoral democracies. Generally, they are invited to vote in referendums, initiatives, or elections on average four times a year. Given these specific circumstances, the direct democratic context offers an ideal environment to investigate whether citizens acquire habits in their voting behavior.

Drawing on a rich data set from the Swiss canton of Geneva and using a latent growth curve modeling approach, I am able to measure and explore the turnout behavior of individuals up to 46 times between 1996 and 2005. To date, this is an unprecedented large number of time points when investigating voting behavior. Given also that the actual turnout is measured instead of self-reports, this study is in an excellent position to investigate how long it takes for individuals with different voting history to become habitual voters or habitual abstainers.

The results show that there is indeed an element of inertia in turnout that is probably due to habit-forming effects of voting behavior. However, habit formation seems to

operate differently among typical voters and non-voters. The growth curve for those who abstained in the first six votes since eligibility becomes almost flat. Their odds-ratios for participating in any future voting occasion throughout the sample remain lower than 0.1, if salience is held at the mean. This can be seen as an indicator that these individuals have actually become habitual non-voters. The implications of this finding are clear; the first few voting occasions in one's life are decisive for her/his future participation behavior. Missing the opportunity to participate during the first few occasions after reaching eligibility age, will set one in a lifelong path of abstaining.

The voting behavior of those who participated in all six votes since eligibility is less stable over time. Although, the predicted turnout odds-ratios for this group remain much higher than those of their other peers throughout the observation period, they drop dramatically over time.

In light of this finding, Chapter 4 concludes that voting habits may be acquired much faster by typical non-voters than typical voters. This is a novel finding in the voting behavior literature, since, to the best of my knowledge, none of the previous studies has illustrated the differences between typical voters and non-voters with regard to habit acquirement.

Chapters 2, 3, and 4 are self-contained such that they introduce, discuss and conclude the relevant research questions and the theoretical and empirical results within the respective chapter.

1.1 Differentiating Between 'Persistence' and 'Habituation'

Some of the existing voting behavior literature constantly uses the terms persistence and habituation interchangeably (see Dinas, 2012, p. 432). Although, these two terms are similar, they do not convey the same meaning. Persistence is an observed behavior and

habituation may be the cause for the persistence. Because habits are formed only after a steady repetition of the same behavior over time, one should be cautions as to when persistence in voting behavior may be interpreted as evidence for habit formation. If a study is not taking a deep look into the voting history of individuals or if individuals' voting behavior is being studied over a short period of time, it might be far-fetched to portray persistent behavior as a consequence of habit formation. In such cases, the use of the term persistence seems more appropriate than habituation. For the sake of clarity, I differentiate between persistence and habit formation in the following way:

Persistence in voting behavior exists if a person who has voted at $t-1$ has a higher probability of voting again at t than an otherwise identical individual who did not vote at $t-1$. In the second chapter, we use the term persistence, because the main concern there is to explore whether persistence thesis, already established in the electoral research, can also be extended to the direct democratic votes. Chapter 2 does not model individuals' voting history over a long stretch of votes, but, given the wild fluctuation in salience across votes, it seeks to find out whether behaviors at $t-1$ self-enforce themselves at t.

Habitual voting behavior, on the other hand, implies that future turnout decisions become unconscious or automatic. A habitual voter or an abstainer is defined as someone who makes turnout decisions in the absence of weighting the pros and the cons of participation. The fourth chapter, specifically seeks to find out how many times an individual must repeat the same voting behavior in order for it to become habitual. I take a deep look into the voting history of eligible voters and draw they propensity to vote in the future, given their behavior during their first three to seven votes. Further, I investigate whether the predictive power of vote salience, an otherwise very influential event, remains stable over time. This then helps to uncover if citizens are still weight-

ing the pros and the cons of participation. Hence, in this case the use of the term habituation seems more accurate than persistence.

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2

Persistence in Voting Behavior: New Empirical Evidence from a Direct Democratic Context

Kushtrim Veseli
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Several studies have documented that voter turnout is persistent. However, the evidence to date on turnout persistence pertains solely to elections for political office. We do not know yet whether turnout in a direct democracy follows a similar pattern or obeys a different logic. Using a unique data set from the Swiss canton of Geneva, we explore the nature of direct democratic participation. The data consists of the actual turnout behavior of the entire population between 34 and 46 different votes taken at different time points. Focusing on eligible first-time voters and their subsequent turnout behavior, we find strong evidence that voter turnout is also persistent in direct democracy. Indeed, turnout for direct democratic votes appears equivalent with votes for political office. This underlines the importance of persistence in voting behavior as a general explanation of voter turnout.

2.1 Introduction

There is a growing consensus that turnout decisions are not made anew at each election, as Downs (1957) would make us believe. Instead, there is evidence that turnout is persistent over time (Andrews, 1991; Crouch, 1977; Denny and Doyle, 2009; Franklin, 2004; Gerber, Green and Shachar, 2003; Green and Shachar, 2000; Milbrath, 1965; Miller and Shanks, 1996; Plutzer, 2002; Verba and Nie, 1972). It is thus the turnout decision that a citizen makes early on in life that may set the stage for a future pattern of activity or passiveness.

One limitation of the literature to date is that it has focused solely on elections for political office (but see Serdült, 2013). We do not yet know if the persistence pattern extends to referendums and initiatives or if turnout in those direct democratic institutions abides by a different logic. This not only raises questions about the generality of the turnout persistence thesis; it also presents a major limitation in light of the growing popularity of direct democracy around the world (Hug, 2004; LeDuc, 2002).

From one perspective, it may seem obvious that persistence in voting behavior should extend to direct democracy. The persistence thesis basis on the idea that past behaviors tend to reinforce themselves also in the future. There is no psychologically compelling reason why this would not also hold for direct democratic participation. From another perspective, however, it is not so obvious why persistence in voting behavior should extend to direct democracy. Whereas the salience of elections for office does vary, it is usually at the margins. National political offices, for example, are generally important. This is much less the case with referendums and initiatives that address issues whose salience can vary quite strongly from one time point to the next. One day, the citizen is asked to vote on a highly salient issue that could completely alter the economic, social,

or political landscape. On another day, the issue may be extremely esoteric and of interest only to experts or specific stakeholders. In this environment, it would not at all be surprising if voters determine participation on a case by case basis. If so, the scope of the persistence thesis could be much reduced.

In this study, we explore the question of whether turnout is persistent, too, in direct democratic votes. In doing so, we draw on a rich data set from the Swiss canton of Geneva, which has a number of unique and advantageous features. First, we possess official data about a person's participation or abstention on a specific day, as opposed to self-reported turnout. The disadvantages of survey-based self-reported turnout measures, especially when they have not been validated, are well-known (e.g., Selb and Munzert, 2013) and are avoided with this data. Second, the data comprise the entire population of eligible voters in the canton. This bypasses other problems that sometimes arise with survey-based turnout studies, namely that the politically engaged are over-represented (Selb and Munzert, 2013). In addition, there is sufficient data to focus on subsets of citizens. This will be the strategy in this study, as we focus on individuals at age 18, the first time they have an opportunity to vote. Finally, we have at our disposal up to 46 time points where participation was measured, 34 of which are direct democratic votes and 12 elections for political office. This puts us in an excellent position to explore persistence in voting behavior. Indeed, the number of time points in the data is unparalleled for research on turnout persistence.

Although this study's primary focus is on turnout in initiatives and referendums, one must recognize that direct democratic practices co-exist with electoral democracy everywhere around the world. Citizens participating in direct democracy may also participate in electoral democracy and vice versa. Thus, part of this study's analysis considers direct democratic turnout in isolation, whereas another part considers

participation in initiatives, referendums, and elections for political office.

The study is organized as follows. In section 2.2, it explores the extant turnout literature, with a special focus on the persistence, inertia, and habituation literature. In section 2.3, it is discussed how direct democracy may differ from electoral democracy in the participation patterns that it generates. Section 2.4 describes the data and methodological challenges of studying persistence in voting behavior. Section 2.5 presents the results and section 2.6 the conclusions.

2.2 Is Turnout Persistent?

2.2.1 Competing Theories of Turnout

One way of organizing the voluminous turnout literature is to consider the decision logic that citizens are expected to follow. On one hand, much of the scholarship implicitly or explicitly assumes that citizens decide anew in every election whether they will participate. On the other hand, prominent scholars believe that voting is much like a habit. Once the citizen has voted a number of times, there is no more conscious decision as to whether the person should go to the polls: he or she simply does.

Downs (1957) is emblematic for the first line of theorizing. His famous cost-benefit model of turnout suggests that citizens look at the potential benefits of voting, the probability that they will play a critical role in bringing about those benefits, and the costs, which they are certain to occur. In principle, the voter weights the costs and benefits each time an election occurs, although it is of course possible — according to Downs, indeed likely — that the calculus always produces the same conclusion and hence introduces persistence in turnout patterns.

Others have modified the Downsian model by moving it from an investment to a

consumption logic. Thus, non-material benefits of the vote enter the decision calculus (see Ordeshook and Zeng, 1997; Riker and Ordeshook, 1968). These non-material benefits are synonyms for different aspects of civic virtues such as one's self-image as a politically involved citizen, fulfilling one's obligation to vote, not violating accepted social norms, and perceptions of equity and fairness (e.g., Runciman, 1966). Here, too, the calculus may always produce the same outcome but the baseline assumption is that citizens engage in the calculus each time an election occurs.

Much less explicit in their decision theoretic focus are other common theories of voter turnout. This includes the oldest empirical studies, attributing fluctuations in turnout to the closeness of the election (Boechel, 1928; Gosnell, 1927; Merriam and Gosnell, 1924; Tingsten, 1937). It also includes work focusing on whether citizens perceive any differences between political parties (Doppelt and Shearer, 1999). Implicitly, these works speak to the probability of changing the election outcome and the benefits from the outcome in the model of Downs (1957).

Quite a different view is the idea that voting is habitual. This idea goes back to (Verba and Nie, 1972) but is consistent as well with (Milbrath, 1965). Here, it is assumed that voters participate because that is what they always do. They do not consciously decide to vote each time there is an election. On the contrary, once they have established themselves as a voter, people no longer consciously need to decide whether to go to the polls or not. Turnout becomes reflexive rather than reflective, to borrow the language of neuropsychology (Lieberman, 2003). Thus, this form of persistence in voter turnout is not only a byproduct of repeated decisions always producing the same result. Rather, it is a consequence of routines established early in life that have been taken for granted ever since. To put it in more concrete terms, persistent voting exists when a person who has voted in the past has a higher probability of voting again than an otherwise

identical individual who did not previously vote.

Key to establishment of the initial conditions favoring turnout may be individual traits (Denny and Doyle, 2009; Milbrath, 1965) but also socioeconomic resources (Plutzer, 2002; Verba, Schlozman and Brady, 1995), socialization (Gimpel, Lay and Schuknecht, 2003), and mobilization (Kimberlee, 2002). The conjunction of these factors sets the stage for turnout decisions early on in life and these, in turn, determine if turnout becomes persistent.

2.2.2 Evidence for Persistence in Voting Behavior

The persistence perspective on turnout by now has acquired an impressive following (Andrews, 1991; Crouch, 1977; Denny and Doyle, 2009; Franklin, 2004; Gerber, Green and Shachar, 2003; Green and Shachar, 2000; Milbrath, 1965; Miller and Shanks, 1996; Plutzer, 2002; Verba and Nie, 1972). As Gerber, Green and Shachar (2003, p. 540) write, *"persistence in voting ranks among the most robust empirical generalizations in political science."* But what empirical evidence do we have precisely for the persistence thesis? To our mind, four papers stand out as particularly important for answering this question: Green and Shachar (2000), Plutzer (2002), Gerber, Green and Shachar (2003), and Denny and Doyle (2009).

Green and Shachar (2000) were among the first to provide statistical estimates of persistence formation in turnout.[1] Using a two-stage probit model, they estimated the effect of past turnout in a U.S. presidential election on current turnout in the same type of election. Using the 1972-76 and 1992-96 panels of the American election studies, they found strong persistence in turnout behaviors. On the other hand, whether one had participated in a midterm election had much less predictive power on whether one

[1] The authors use the term 'consuetude'.

would participate in the next presidential election. Thus, the persistence in voting behavior was strong only for presidential elections. One problem with this study is that the two-stage probit estimates are inconsistent due to unobserved heterogeneity (see Denny and Doyle, 2009), a problem we address in this study's analysis section.

A second landmark study in turnout persistence comes from Plutzer (2002).[2] He argued that most young citizens start as non-voters but over time become habitual voters, albeit at different speeds. Using latent growth curves, Plutzer was able to map citizens' voting behavior over time and find out how parental resources, e.g., political knowledge, self-reported vote, political trust, etc., impinge on the developmental trajectories of participation. Although Plutzer does not provide an estimate of the extent of persistence (see Denny and Doyle, 2009), the study has played a major role in establishing the case that persistence exists.

Gerber, Green and Shachar (2003) were the first to provide experimental evidence about persistence in voting behavior (for other experimental evidence see Fieldhouse, Cutts, John and Widdop, 2014; Green, 2010). In a field experiment with 25'000 registered voters prior to the midterm elections of 1998, they provided get-out-the-vote messages. These produced a significant increase in turnout, an effect that carried over to the 1999 elections. Specifically, using an instrumental variables approach, Gerber, Green and Shachar (2003) found that those who had been contacted on 1998 were 46.7 percentage points more likely to turn out. Their interpretation of the finding is that voting may be habit-forming. While we certainly agree they have made a strong case for persistence, it is less certain whether this can be called habituation due to the short time period of their study.

The last contribution this study reviews is from Denny and Doyle (2009). This article

[2]Plutzer (2002) uses the term 'inertia'.

can be seen as a methodological critique of some of the earlier studies, which may have caused scholars to overestimate persistence effects. Some of the methodological criticisms are ones that this study addresses as well and will be discussed in section 2.4. The article may also be read, however, as an effort to study persistence in a new context, namely Great Britain. Using data from the National Child Development Study and studying a period of about 18 years, Denny and Doyle (2009) find that the effect of voting inertia is around 13 percentage points. This is quite a bit lower than other studies have found, but still points to clear persistence.

The conclusion from these central studies is clear. Turnout tends to persist and may even be considered as a habit (e.g., Gerber, Green and Shachar, 2003). Different authors disagree about the size of the effect but that such an effect exists is not in dispute. The problem, however, is that all of these studies take place in the context of elections for political office. While such elections are most central to democracy, they do not exhaust it. A large — indeed, growing (LeDuc, 2002; Hug, 2004) — number of democratic countries mix elections for political office with referendums and initiatives on issues. It remains an open question whether the finding of persistence of turnout generalizes to these other forms of democratic practice.

2.3 Turnout in Direct Democracy: More of the Same?

Should direct democratic turnout be any different from that in electoral democracy? One could argue that general processes underlie persistence, so that the differences should be minimal. On the other hand, direct democratic votes possess some peculiar features that may well produce a different turnout logic as that found in elections for political office.

The question of why people tend to develop persistent voting behavior is answered by

learning theories in psychology. Here we can draw a distinction between conditioning and cognitive theories, both of which hold relevance for the persistence of turnout. Conditioning theories focus on the positive reinforcement of behaviors, whereas cognitive theories focus on the cognitive aspects of the learning process (e.g., Ormrod, 2011). The idea that positive reinforcement plays a role in persistence is emphasized by Marcus, Neuman and MacKuen (2000). Their affective intelligence model associates persistence in voting behavior with the experience of enthusiasm, which also is an important factor in promoting participation. Positive feelings associated with a certain behavior such as voting help to turn that behavior into a persistent one. Such positive feelings may originate from the sense of fulfilling one's civic duty or supporting one's cause, or it could come from external approval of one's actions. Regardless of the cause, experiencing positive feelings about participation, especially during the impressionable years (Krosnick and Alwin, 1989), sets the stage for persistence in voting behavior.

Persistence in turnout may also have a cognitive component. The individual who becomes eligible to vote for the first time may wonder to what extent he or she is capable of making an electoral choice. Going to the polls at this time may actually alleviate such concerns. As Stenner-Day and Fischle (1992) show, there is a positive feedback loop from participation to political efficacy. By this logic, a couple of participatory experiences may boost a person's confidence in his or her cognitive ability to render an electoral choice, which would then lay the ground for persistence in voting behavior. Indeed, one of the things first-time voters may learn is how to navigate the political landscape, which simplifies their choices, reduces their potential bewilderment, and, consequently, stimulates persistence in turnout. The learning theoretic processes sketched here are general in nature. There is really no reason to believe they should play out differently in direct democracy compared to electoral democracy. From this

perspective, then, it seems reasonable to assume that turnout persistence holds every bit as much for direct democratic turnout.

What would speak against a universal persistence thesis? The answer is actually contained in one of the empirical studies that the current study cited. Green and Shachar (2000) found that prior participation in a presidential election helps to predict current participation in such an election, but that past participation in a midterm election does not have this effect. The thing that separates presidential and midterm elections is that the former are typically high-stimulus, whereas the latter are generally low-stimulus (Campbell, 1960). The key is thus salience: how important is a particular election to the voter.

That salience matters for political behavior is widely accepted. Discussing the nature of public opinion, Converse (1964) presented the idea of issue publics: individuals who deem a particular issue of great importance, who consequently hold stable and well-crystallized opinions not found in the public at large and, who one would surmise, have an interest in acting on the issue. Building on Converse, Krosnick (1988) further demonstrated that opinions deemed personally important matter for political behavior. Speaking about turnout specifically, Franklin (1993) showed that it is among the most important factors in explaining why people vote.

For the purpose of this study, the role of salience in relation to turnout persistence is particularly important. Here, an important difference between elections for political office, on one hand, and initiatives and referendums, on the other, should be noted. Although elections for political office fluctuate in terms of their salience, this pales in comparison to initiatives and referendums. One day, a citizen may be asked to vote on an important issue, whereas, on another day, the issue may be esoteric and of little interest to the general public. In this context it is important to note that salience

may be intrinsic to the issue — for example, a vote that affects a country's sovereignty — or may be the consequence of extensive mobilization efforts on the part of political parties and other stakeholders (Kriesi, 2005; Rosenstone and Hansen, 1993). Regardless of their source, the large oscillations in issue salience in direct democracy could easily weaken the persistence of turnout, as the participation in one referendum or initiative may hold little predictive power for participation in the next one. Instead, time effects that capture the peculiarities of a particular vote should be key to understanding direct democratic turnout.

The differences between direct and electoral democracy still go further. In establishing persistence in voting behavior, the first occasion on which a person gets to vote plays an important role. If this is a low-stimulus vote, then the person may decide that voting is of little interest to him or her. If this is a high-stimulus vote full of excitement, however, he or she may be mobilized and set on a future path of active participation. Hence, it is important to explore the nature of the vote at the time of first eligibility. In this context, geographic scope is a further nuance to consider, at least in the Swiss case. Elections for office, as well as referendums and initiatives, may take place at the federal level or at the cantonal/communal levels. Since federal elections have very little effect on the composition of the national government in Switzerland, which has been driven by the so-called magical formula since the 1950s (Kriesi and Trechsel, 2008), one should expect a negative effect when the first voting opportunity for a person pertains to a federal election for political office.

2.4 Methodology

2.4.1 Data

The data come from the official voting records of the Swiss canton of Geneva. Switzerland is emblematic for direct democracy, having conducted initiatives and referendums since 1891. Hence, it provides an excellent test bed for persistence effects in a direct democracy.

The data span the period 1996-2005 and encompass 46 different voting occasions, including initiatives, referendums, and elections for political office.[3] These occasions cover federal, cantonal, and communal elections. For each voting occasion, the canton recorded whether a person participated or did not.[4] The data also include some demographic information, specifically age, gender, marital status, and whether the person was born in the canton.

For reasons that will be explained in the next section, this study focuses on individuals born in 1978 and after. The data set contains more than 25'000 individuals and 613'643 person-votes. Basic descriptive statistics can be found in Table 2.1, where it is distinguished between models that consider only referendums and initiatives and models that also consider elections.

We believe, the Geneva data are an ideal test bed for studying persistence in voting behavior. Not only do they provide a sizable sample of individuals, they also record actual turnout. This offers a major advantage over survey research. As Selb and Munzert (2013) point out, both the over-representation of voters and mis-reporting create

[3] See Table 2.5 in the Appendix.

[4] The data have a daily resolution. On a particular day, there may be multiple initiatives/referendums, but the cantonal data do not identify in which of these the person participated. All we know is whether the person participated in at least one of these votes.

Table 2.1: Descriptive Statistics

	Direct Democratic Turnout Only		All Turnout	
	Mean	*SD*	*Mean*	*SD*
Turnout	0.380	0.485	0.347	0.476
Female	0.499	0.500	0.499	0.500
Native of Geneva	0.580	0.494	0.580	0.493
Married	0.030	0.171	0.030	0.171
Age	21.480	2.304	21.518	2.296
Federal Vote	0.869	0.337	0.711	0.453
Popular Vote			0.728	0.445
$N \times T$	499,256		682,906	

Notes: Based on official election statistics from the canton of Geneva.

major biases in survey-based estimates of turnout. A third advantage of the Geneva data is that it provides a long time span and many time points. This is important if the goal is to estimate persistence effects on turnout. Indeed, in the extant literature only Denny and Doyle (2009) cover a longer time span, but they have fewer time points at their disposal. From a statistical perspective, as well, the availability of many time points has benefits, as increases the plausibility of relying on the asymptotic properties of estimators. Finally, the Geneva data allows to separate turnout in direct democratic and other votes, due to the fortunate circumstance that there are no time points on which both an election and referendum/initiative were held.

2.4.2 Methods

Past studies of persistence in turnout have had to contend with two methodological problems. The first problem is unobserved heterogeneity. One reason why turnout may persist is that a citizen's turnout decision is driven by characteristics such as a sense of

civic duty and parental socioeconomic status, which are time invariant. These factors cannot always be measured but if they are not taken into consideration somehow, they may produce an over-estimate of the effect of past turnout behavior on the present (Denny and Doyle, 2009; Heckman, 1981).

A second related problem is the so-called initial conditions problem, which means that the observation period and the stochastic process generating individuals' voting experience do not start simultaneously (Arulampalam, Booth and Taylor, 2000, p. 26; Heckman, 1981). Denny and Doyle (2009) control for this by relying on data about child development, but this study lacks such data. An adequate solution to this problem is to limit this study's focus on individuals who, for the first time, were allowed to vote in the period 1996-2005. While it cannot be guaranteed that the process driving the propensity to participate did not start earlier in these individuals, we think that our strategy at least minimizes the initial conditions problem. A more detailed elaboration of this potential problem can be found in the next subsection.

The general modeling strategy of this study draws from the work of Wooldridge (2005), as elaborated by Rabe-Hesketh and Skrondal (2013). Consider the panel logit model:

$$\begin{aligned} y^*_{i,t} &= \gamma_2 y_{i,t-1} + \boldsymbol{x}'_{i,t}\boldsymbol{\beta} + \delta_{i,t} \\ y_{i,t} &= 1|y^*_{i,t} > 0 \end{aligned}$$

for individual $i = 1, 2, \cdots, N$ and time period $t = 1, 2, \cdots, T$. Here $y^*_{i,t}$ is a latent propensity of voting, $y_{i,t}$ is the observed participation (1) or abstention (0), $\boldsymbol{x}_{i,t}$ is a vector of explanatory variables, and $\delta_{i,t}$ is an error term. The parameter γ_2 captures

how turnout in the previous period influences the propensity to vote in the current period and is, as such, the persitence parameter of our model.

To address the problem of unobserved heterogeneity, we decompose the error term into a subject-specific and time-varying component:

$$\delta_{i,t} \quad = \quad \epsilon_i + v_{i,t}$$

Following the consecutive contributions of Chamberlain (1984), Akay (2011), and Rabe-Hesketh and Skrondal (2013), we assume that ϵ_i is a linear function of the mean of all time-varying explanatory variables, their initial conditions, and an error term:[5]

$$\epsilon_i \quad = \quad \alpha_0 + \bar{\boldsymbol{x}}_i'\boldsymbol{\alpha}_1 + \boldsymbol{x}_{i0}'\boldsymbol{\alpha}_2 + u_i$$

The model is completed by correcting for the initial conditions problem:

$$\epsilon_i \quad = \quad \alpha_0 + \gamma_1 y_{i0} + \bar{\boldsymbol{x}}_i'\boldsymbol{\alpha}_1 + \boldsymbol{x}_{i0}'\boldsymbol{\alpha}_2 + u_i$$

or

$$y_{i,t}^* \quad = \quad \gamma_1 y_{i0} + \gamma_2 y_{i,t-1} + \boldsymbol{x}_{i,t}'\boldsymbol{\beta} + \alpha_0 + \bar{\boldsymbol{x}}_i'\boldsymbol{\alpha}_1 + \boldsymbol{x}_{i0}'\boldsymbol{\alpha}_2 + u_i + v_{i,t}$$

Here $u_i \sim \mathcal{N}(0, \sigma_u^2)$ and $v_{i,t-1}$ follows the standard logistic distribution.

The model shown here is identical to a random intercept logit model (cf. Wooldridge, 2005). The inclusion of the initial values of the explanatory variables, proposed by Rabe-Hesketh and Skrondal (2013), makes it possible to estimate the model with unbalanced

[5] If a variable is time-invariant, then the mean and initial conditions of that variable do not have to be specified in the model.

data, as we have in our data set.[6]

The model is estimated using the `xtlogit` and `xtprobit` commands in Stata, which use mean-variance adaptive Gauss-Hermite quadrature to obtain full information maximum likelihood estimates. For purposes of interpretation, the study relies primarily on the odds ratio and average marginal effects.

2.4.3 A Brief Discussion of the Initial Conditions Problem in the Context of this Study

As mentioned above, the initial conditions problem arises when the process generating voting experience stars before the observation period (see Arulampalam, Booth and Taylor, 2000, p. 26; Skrondal and Rabe-Hesketh, 2014, p. 216). In order to avoid this problem, this study relies on three remedies, one of which is due to the fortunate circumstance of having a panel data set with large T and N.

First, this study's unit of analysis are only those individuals who were not allowed to vote before the beginning of the observation period, i.e., 1996. All the individuals who are older than eighteen at the beginning of the observation period are excluded from the analysis. While this takes care of the largest part of the problem, the initial conditions problem may still be present. Existing studies on turnout persistence, including this one, know very little about the upbringing of the soon-to-become-eligible-voter population (for a partial exception see Denny and Doyle, 2009). In all likelihood, during early years of socialization, individuals are exposed to processes that influence their propensity to turnout once they reach eligibility age. If the process driving the propensity to participate does, indeed, starts earlier in these individuals than the observation

[6]The original model of Wooldridge (2005) can be estimated only with a balanced panel. In our case, this would imply a great loss of data as we would be able only to focus on those who turned 18 at the beginning of the series and remained in the panel for the entire duration.

period of the study, the lagged version of the dependent variable ($y_{i,t-1}$) will correlate with the individual specific error term (u_i). As a consequence, a 'naive' model, without appropriate corrections, would most likely overestimate the magnitude of persistence in voting behavior (Heckman, 1981; Orme, 2001; Wooldridge, 2005; Denny and Doyle, 2009). This brings us to the second point.

In order to adequately handle the remainder of the initial conditions problem, we use a model proposed by Wooldridge (2005) and further elaborated by Rabe-Hesketh and Skrondal (2013). As shown in Monte Carlo experiments, this model is capable of delivering consistent estimates also when an initial conditions problem is present (Rabe-Hesketh and Skrondal, 2013, p. 348). The derivation of this model is shown in the previous subsection.

Third, as T and N become large, the model estimates become increasingly consistent, despite the initial conditions problem (e.g., Hsiao, 2002; Skrondal and Rabe-Hesketh, 2014). As Skrondal and Rabe-Hesketh (2014, p. 2017) put it: *"The initial conditions problem is not a major problem for long panel data with a large number of occasions or panel waves, since the effect of misspecification for the initial response is then swamped by the large number of responses that are correctly modeled."*

Hence, *a)* excluding the individuals who were eligible to vote before the start of the observation period, *b)* using a model that is adequate in handling the initial conditions problem, and *c)* estimating the model using a data set with a very large T (up to 46 time-points) and N (up to 25'010 individuals), the model estimates of this study are probably very little — if not at all — biased by the problem of the initial conditions.

2.5 Results

We present our results in two steps. We begin by considering only direct democratic turnout, thus omitting time points from the data that pertain to elections for political office. In the next step, we include all types of votes; this allows us to explore in greater detail the differences that exist between turnout in direct and electoral democracy.

2.5.1 Turnout and Persistence in Direct Democratic Votes

Does the turnout persistence thesis extend to direct democratic votes? To answer this question, we present two different models, namely a model that includes lagged turnout (Model 1) and one that does not (Model 2). Both models include fixed effects for time, which, among other things, capture the salience of specific voting occasions. Model 1 thus states that, in addition to time-specific salience effects, there exists a persistence component to turnout. Model 2 denies this persistence component and, in light of other research, suggests that direct democratic turnout abides by a different logic than electoral turnout.

The estimates for the models can be found in Table 2.2. The first thing to point out here is that Model 1 fits the data considerably better than Model 2. The lagged effect of turnout is not only statistically significant but, more telling, its inclusion dramatically reduces the AIC and BIC. We consider this to be strong evidence that persistence plays an important role in direct democratic turnout. The question now is how much it matters and whether this is comparable to effects found for turnout in elections for political office.

Table 2.2: Direct Democratic Turnout in Geneva 1996-2005

Dependent Variable: **Voted** *(1 = Yes, 0 = No)*	***Model 1*** *Estimate (SE)*	***Model 2*** *Estimate (SE)*
Voted at $t-1$	0.703***	
	(0.009)	
Voted at $t=0$	1.595***	2.194***
	(0.019)	(0.020)
Female	0.073***	0.078***
	(0.019)	(0.020)
Native of Geneva	0.101***	0.102***
	(0.019)	(0.019)
Married	0.132***	0.164***
	(0.036)	(0.035)
Married at $t=0$	0.294	0.323
	(0.310)	(0.330)
Married Mean	-0.933***	-0.981***
	(0.098)	(0.103)
Age	-0.198***	-0.223***
	(0.014)	(0.014)
Age at $t=0$	-0.184***	-0.196***
	(0.033)	(0.035)
Age Mean	0.316***	0.334***
	(0.027)	(0.027)
Federal Vote	0.549***	-1.616***
	(0.167)	(0.171)
Federal Vote Mean	-0.517*	-0.839***
	(0.223)	(0.209)
Federal Vote at $t=0$	-0.157***	-0.211***
	(0.025)	(0.026)
Constant	-0.588	0.080
	(0.553)	(0.583)
σ_u (ICC)	1.249***	1.370***
	(0.009)	(0.009)
ρ	0.322***	0.363***
	(0.003)	(0.003)
AIC	426569.1	453967.6
BIC	427073.1	454474.1
Log-Likelihood	-213238.6	-226937.82
N	25'833	26'822
N × T	423'334	446'896

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: The time dummies have been suppressed. For complete results consult Table 2.6 in the Appendix.

Looking at the estimate of lagged turnout for Model 1, it can be seen that the odds of voting the next time are increased by 102 percent comparing someone who voted in the election immediately prior and someone who did not. Translated to the probability scale, this implies an average marginal effect of 0.117: having voted previously, increases the probability of voting now on average by roughly 12 percent, holding all else equal. This is in line with the estimate for lagged turnout found by Denny and Doyle (2009) but is much smaller than that found by Gerber, Green and Shachar (2003). The latter estimate, however, is almost certainly biased due to unobserved heterogeneity and initial conditions. Our first conclusion, then, is that persistence in turnout is not limited to elections but extends in a fairly straightforward manner to direct democracy, at least in the case of Geneva.

The marginal effect of 0.117 is an average over all of the direct democratic votes. The bandwidth of the effect is between 0.086 and 0.127, as Figure 2.1 shows. These fluctuations reflect the changing nature of the votes over time, including oscillations in salience. Even so, the gap in the turnout probabilities of previous non-voters and voters is not particularly dramatic. This further underscores the importance of persistence in turnout.

This result is not unsurprising, however, for one could argue that direct democratic votes cannot have the same predictive power of future turnout as contests for political office do. This is because initiatives and referendums often take place in very different contexts; one time citizens are invited to vote on an issue that could completely alter the political landscape, while next time the issue may be very low in salience and of interest only to specific stakeholders. Whereas contests for political office are generally important and take place in a very similar context, it is logical to assume that previous participation in an election is a better predictor of future participation in the subse-

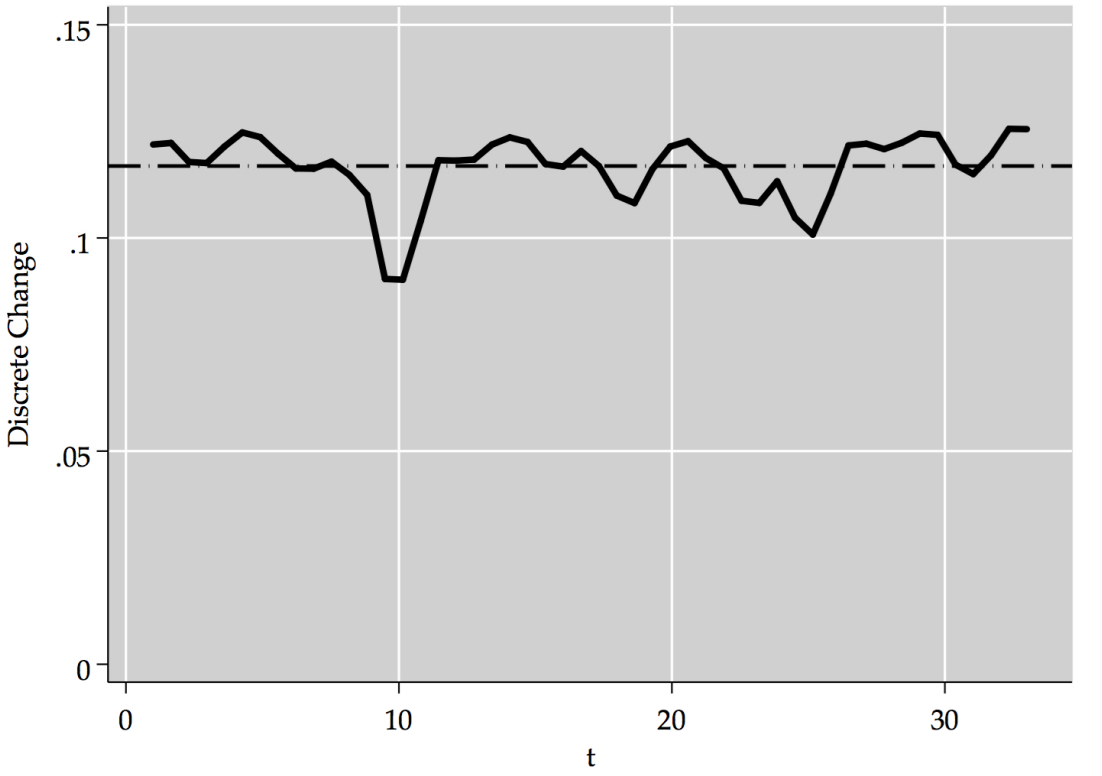

Figure 2.1: Legend: The horizontal axis displays successive direct democratic votes, whereas the vertical axis displays the discrete change in the predicted probability of voting for those who previously participated and those who did not. The dashed line shows the average marginal effect.

quent election. Nevertheless, the empirical evidence shows that, the obvious differences between direct democratic and electoral contests notwithstanding, the act of voting itself seems to underlie persistence.

Two other features stand out in Table 2.2. First, federal initiatives and referendums boost greater turnout. The odds of participating in one of these votes is 73 percent higher than those of participating in a cantonal/communal initiative or referendum, holding all else constant. By contrast, a negative effect on the turnout is observed when the first voting occasion concerns a federal issue. This holds implications for persistence in voting behavior. If a person's first vote occurred at the time of a cantonal or communal initiative or referendum, then this might help to set him or her on a path of direct democratic participation. However, if subsequent votes remain at this geographic level, this may even out the initial boost.

2.5.2 Turnout and Persistence: A Combined Analysis

Now that we have looked at direct democratic turnout exclusively, it is time to consider the fact that Swiss citizens also get the opportunity to participate in elections for political office. If we add those elections, how does this affect the lagged turnout effect? Does it get stronger, as one would expect if persistence is more prominent in elections? Or does it get weaker, as many elections for political office are relatively inconsequential in a consensus democracy such as Switzerland?

Table 2.3: Turnout Across All Votes in Geneva 1996-2005

Dependent Variable: **Voted** *(1 = Yes, 0 = No)*	*Estimate*	*SE*
Voted at $t-1$	0.683***	0.008
Voted at $t=0$	1.740***	0.061
Female	0.061**	0.019
Native of Geneva	0.125***	0.018
Married	0.119***	0.032
Married at $t=0$	0.362	0.310
Married Mean	-0.967***	0.097
Age	-0.204***	0.014
Age at $t=0$	-0.202***	0.033
Age Mean	0.328***	0.026
Federal Voting Occasion	0.530**	0.166
Federal Voting Occasion at $t=0$	0.094	0.065
Federal Voting Occasion Mean	-0.259	0.229
Direct Democratic Vote	0.300***	0.027
Direct Democratic Vote at $t=0$	-0.094	0.061
Direct Democratic Vote Mean	-0.359	0.192
Federal Voting Occasion at $t=0$ × Direct Democratic Vote at $t=0$	-0.172*	0.081
Federal Voting Occasion at $t=0$ × Voted at $t=0$	-0.097	0.103
Direct Democratic Vote at $t=0$ × Voted at $t=0$	-0.076	0.092
Direct Democratic Vote at $t=0$ × Federal Voting Occasion at $t=0$ × Voted at $t=0$	0.089	0.126
Constant	-0.593	0.559
σ_u (ICC)	1.282***	0.009
ρ	0.333***	0.003
AIC	559274.4	
BIC	559996.3	
Log-Likelihood	-279573.18	
N	26'760	
N × T	585'605	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: The time dummies have been suppressed. For complete results consult Table 2.7 in the Appendix.

Table 2.3 shows the results from a combined analysis of all votes in Geneva. Again, we see a strong and significant effect of the lagged dependent variable. Indeed, the marginal effect is 0.109, which is barely smaller than that found in the analysis of direct democratic votes alone (0.117). This suggests that the persistence logic does not vary between referendums and initiatives, on one hand, and elections for political office, on the other.

Although the turnout persistence effect is roughly the same in the combined analysis as before, the type of vote may still be consequential. We see that a significant positive effect is associated with a direct democratic vote: all else equal, the odds of voting in an initiative/referendum are 35 percent higher than in an election for political office. Thus, if a person ends up having an early voting experience involving a referendum or initiative, this may persuade them to vote on that occasion. This, then, increases the probability of future voting through the persistence process. Also, the administrative level on which the voting occasion takes place, seems to play an important role in boosting participation. All else equal, the odds of voting in an occasion at the federal level are 70% higher than in an occasion at the cantonal/communal level. Hence, if a person ends up having an early voting experience involving a voting occasion at the federal level, this may persuade her/him to vote on that occasion, which again strengthens the probability to vote in subsequent contests. The effect is opposite, however, if the person's first voting experience involves a direct democratic vote at the federal level. This runs against the postulated notion in section 3 of this study, that one should expect a negative effect when the first voting opportunity for a person pertains to a federal election for political office. A possible explanation for the negative sign in the coefficient for the interaction term regarding the first direct democratic vote at the federal level would be that someone has initially a "bad" voting experience,

in that they vote in a low-stimulus initiative or referendum and/or do not find what they voted on interesting. This experience then leads them to be less likely to vote in subsequent occasion, however only until they have a "good" experience. A second possible explanation is that because the variance in salience is much higher for direct democratic votes, then someone who first votes in a highly salient contest may be less spurred to vote in a subsequent, much less enticing voting occasion.

Table 2.4 shows the average predicted probabilities for different vote types for those who previously participated and those who did not. All else equal, if person i participates at $t-1$ and that voting occasion involves an initiative/referendum at the federal level, his/her probability of participating in the subsequent occasion increases on average and across all votes by 11.35%. An increase of 10.61% is expected if the voting occasion at $t-1$ is a direct/democratic vote at the cantonal/communal level. Furthermore, voting in a federal election at $t-1$ increases the probability of voting in the next occasion by 9.90%, all else held equal. The boost is almost identical for elections at the cantonal/communal level. All in all, the differences among different vote types are minuscule. Hence, the act of voting itself at $t-1$ has a strong positive impact on turnout at t, regardless of vote types.

Table 2.4: Estimated Probabilities for Different Vote Types

	Initiative/Referendum	Election
Federal	11.351 %	9.895 %
Cantonal/Communal	10.606 %	9.904 %

Notes: Predicted probabilities of voting for those who previously participated and those who did not.

2.6 Conclusions

Voter turnout remains a prominent concern in political science. The Downsian paradox of voting would suggest that no one should vote if the act entails any costs at all and yet people participate (Downs, 1957). But perhaps there is no paradox. Perhaps no one engages in the kind of decision making Downs and others have postulated. Citizens vote because, well, that is what they always do. They do not think about it very much; they just participate.

In recent years, evidence for the turnout persistence thesis has accumulated (Andrews, 1991; Denny and Doyle, 2009; Gerber, Green and Shachar, 2003; Green and Shachar, 2000; Plutzer, 2002). Until now, however, a formidable empirical gap remained, pertaining to the question of whether persistence thesis holds for all types of voting or only for voting for political office. All of the literature has focused on elections, in different countries and at different levels, but none has considered voting in referendums and initiatives. With growing interest in and hopes for direct democratic procedures, it was high time to explore persistence effects in this context.

The objective of this study was to fill the empirical gap. Although it would seem logical that turnout persistence extends to direct democratic votes, one could argue that the wild fluctuations in the salience of issues in initiatives and referendums is not conducive to voting behavior being persistent. This study explores the scope of turnout persistence in Switzerland, a well-known example of direct democracy and thus ideally suited for the task. Leveraging unique data from the canton of Geneva, this study comes to a very clear set of conclusions. First, there is clear persistence of turnout in direct democracy. Second, the scope of this effect is on a scale comparable to other studies (cf. Denny and Doyle, 2009). Finally, in the Swiss context, there is no clear evidence

that persistence in voting behavior plays out differently for referendums/initiatives and elections for political office. Hence, it appears that the persistence effect is general and not specific to electoral democracy.

It is important to note, however, that some of the existing literature uses the terms persistence and habituation interchangeably (see Dinas, 2012, p. 432). According to psychological studies, habits occur only if behaviors are repeated many times in the same context (see, for example, Lally et al., 2010). To the best of our knowledge, none of the studies in the existing literature study the citizens' voting behavior over more than three elections. Under such circumstances, it might be misleading to interpret persistence in voting behavior as evidence for habit formation.

We offer this conclusion with the usual caveats. Although we believe Switzerland to be a good case for studying direct democratic turnout, if only because it generates so much data, we cannot be sure if the Swiss findings generalize to direct democracy elsewhere, including the American states. A major limiting factor here is that Swiss politics works on the basis of a consensus principle (Kriesi and Trechsel, 2008), which takes a lot of the excitement out of elections for political office and putting it in some, but surely not all, initiatives and referendums. This is certainly not true for all other locations that practice a combination of electoral and direct democracy.

A second factor limiting the external validity of this study may be the fact that, apart from Switzerland, initiatives/referendums almost never appear on the ballot on their own. When elections and direct democratic votes appear on the same ballot, they moderate turnout persistence simultaneously. Therefore, in such cases, one may encounter different dynamics then those found in this study.

A third caveat is that we are, of course, limited in the ability to make causal claims. Our study does not take the form of a randomized experiment (cf. Gerber, Green and

Shachar, 2003) but, instead, is a classical observational study. And although we have taken great care to address problems of unobserved heterogeneity and initial conditions, we cannot be certain that we have fully resolved them.

These qualifications notwithstanding, our findings are of considerable importance for scholarship on turnout. They reveal that turnout in a variety of contexts may be driven by the same kind of logic. The beauty of decision theoretic models of turnout such as the Downsian model was always that they strive to great generality. Our findings support the notion that turnout persistence may be similarly general in nature. If that is true — and this study delivers evidence that it is — then persistence in voting behavior is a true competitor of extant models of the vote.

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Appendix

Table 2.5: Voting Occasion over Time

Voting Occasion	*Frequency*	*Percent*
Popular votes: Fed, Cant, Comm 10.03.1996	492.00	0.08
Popular votes: Fed, Cant, Comm 09.06.1996	1,181.00	0.19
Popular votes: Fed, Cant, Comm 01.12.1996	2,379.00	0.39
Popular votes: Fed, Cant, Comm 08.06.1997	3,811.00	0.62
Popular votes: Fed, Cant, Comm 28.09.1997	4,571.00	0.74
Elections: Cant 12.10.1997	4,670.00	0.76
Elections: Cant 16.11.1997	4,919.00	0.80
Popular votes: Fed, Cant, Comm 07.06.1998	6,402.00	1.04
Popular votes: Fed, Cant, Comm 27.09.1998	7,115.00	1.16
Popular votes: Fed, Cant 29.11.1998	7,521.00	1.23
Popular votes: Cant, Comm 20.12.1998	7,675.00	1.25
Popular votes: Fed 07.02.1999	8,008.00	1.30
Elections: Comm 28.03.1999	8,368.00	1.36
Popular votes: Fed, Cant 18.04.1999	8,528.00	1.39
Elections: Comm 02.05.1999	8,629.00	1.41
Popular votes: Fed, Cant 13.06.1999	8,932.00	1.46
Popular votes: Cant 26.09.1999	9,621.00	1.57
Elections: Fed 24.10.1999	9,816.00	1.60
Popular votes: Fed, Cant 12.03.2000	10,725.00	1.75
Popular votes: Fed 21.05.2000	11,211.00	1.83
Popular votes: Fed, Comm 24.09.2000	12,114.00	1.97
Popular votes: Fed, Cant, Comm 26.11.2000	12,577.00	2.05
Popular votes: Fed, Cant, Comm 04.03.2001	13,266.00	2.16
Popular votes: Fed 10.06.2001	13,923.00	2.27
Elections: Cant 07.10.2001	14,802.00	2.41
Elections: Cant 11.11.2001	14,994.00	2.44
Popular votes: Fed, Cant, Comm 02.12.2001	15,112.00	2.46
Popular votes: Fed, Cant 03.03.2002	15,798.00	2.57
Popular votes: Fed, Cant 02.06.2002	16,447.00	2.68

Popular votes: Fed, Cant 22.09.2002	17,310.00	2.82
Popular votes: Cant, Comm 27.10.2002	17,503.00	2.85
Popular votes: Fed, Cant 24.11.2002	17,686.00	2.88
Popular votes: Fed 09.02.2003	18,164.00	2.96
Elections: Fed, Cant 02.03.2003	18,276.00	2.98
Elections: Comm 30.03.2003	18,487.00	3.01
Elections: Comm 04.05.2003	18,760.00	3.06
Popular votes: Fed, Cant 18.05.2003	18,878.00	3.08
Elections: Fed 19.10.2003	19,964.00	3.25
Popular votes: Fed, Cant 08.02.2004	20,675.00	3.37
Popular votes: Fed 16.05.2004	21,357.00	3.48
Popular votes: Fed, Cant, Comm 26.09.2004	22,367.00	3.64
Popular votes: Fed, Cant 28.11.2004	22,793.00	3.71
Popular votes: Cant, Comm 24.04.2005	23,786.00	3.88
Popular votes: Fed 05.06.2005	24,096.00	3.93
Popular votes: Fed 25.09.2005	24,924.00	4.06
Elections: Cant 09.10.2005	25,010.00	4.08
Total	613'643	100.00

Notes: Based on official election statistics from the canton of Geneva.

Table 2.6: Direct Democratic Turnout in Geneva 1996-2005

Dependent Variable:	***Model 1***	***Model 2***
Voted	*Estimate*	*Estimate*
(1 = Yes, 0 = No)	*(SE)*	*(SE)*
Voted at t - 1	0.703***	
	(0.009)	
Voted at t = 0	1.595***	2.194***
	(0.019)	(0.020)
Female	0.073***	0.078***
	(0.019)	(0.020)
Native of Geneva	0.101***	0.102***
	(0.019)	(0.019)
Married	0.132***	0.164***
	(0.036)	(0.035)
Married at t = 0	0.294	0.323
	(0.310)	(0.330)
Married Mean	-0.933***	-0.981***
	(0.098)	(0.103)
Age	-0.198***	-0.223***
	(0.014)	(0.014)
Age at t=0	-0.184***	-0.196***
	(0.033)	(0.035)
Age Mean	0.316***	0.334***
	(0.027)	(0.027)
Federal Vote	0.549***	-1.616***
	(0.167)	(0.171)
Federal Vote Mean	-0.517*	-0.839***
	(0.223)	(0.209)
Federal Vote at t = 0	-0.157***	-0.211***
	(0.025)	(0.026)
Popular votes: Fed, Cant, Comm 09.06.1996	.	2.086***
	.	(0.140)
Popular votes: Fed, Cant, Comm 01.12.1996	-1.335***	0.881***
	(0.138)	(0.129)
Popular votes: Fed, Cant, Comm 08.06.1997	-1.708***	0.479***
	(0.129)	(0.126)
Popular votes: Fed, Cant, Comm 28.09.1997	-0.676***	1.371***
	(0.125)	(0.125)
Popular votes: Fed, Cant, Comm 07.06.1998	-0.771***	1.302***
	(0.125)	(0.126)

Popular votes: Fed, Cant, Comm 27.09.1998	-1.366***	0.779***
	(0.125)	(0.126)
Popular votes: Fed, Cant 29.11.1998	-1.354***	0.707***
	(0.125)	(0.127)
Popular votes: Cant, Comm 20.12.1998	-0.543***	-0.682***
	(0.092)	(0.091)
Popular votes: Fed 07.02.1999	-1.704***	0.374**
	(0.127)	(0.129)
Popular votes: Fed, Cant 18.04.1999	-2.601***	-0.663***
	(0.129)	(0.132)
Popular votes: Fed, Cant 13.06.1999	-0.999***	0.949***
	(0.129)	(0.131)
Popular votes: Cant 26.09.1999	-0.482***	-0.570***
	(0.079)	(0.078)
Popular votes: Fed, Cant 12.03.2000	-0.933***	1.002***
	(0.130)	(0.133)
Popular votes: Fed 21.05.2000	-0.230	1.813***
	(0.131)	(0.134)
Popular votes: Fed, Comm 24.09.2000	-0.727***	1.456***
	(0.133)	(0.136)
Popular votes: Fed, Cant, Comm 26.11.2000	-1.185***	0.921***
	(0.131)	(0.134)
Popular votes: Fed, Cant, Comm 04.03.2001	0.145	2.187***
	(0.135)	(0.139)
Popular votes: Fed 10.06.2001	-1.333***	0.898***
	(0.137)	(0.140)
Popular votes: Fed, Cant, Comm 02.12.2001	-1.059***	0.950***
	(0.141)	(0.144)
Popular votes: Fed, Cant 03.03.2002	0.087	2.114***
	(0.142)	(0.146)
Popular votes: Fed, Cant 02.06.2002	-0.486***	1.699***
	(0.143)	(0.147)
Popular votes: Fed, Cant 22.09.2002	-0.687***	1.462***
	(0.145)	(0.149)
Popular votes: Cant, Comm 27.10.2002	-0.692***	-0.758***
	(0.043)	(0.042)
Popular votes: Fed, Cant 24.11.2002	-0.463**	1.535***
	(0.148)	(0.152)
Popular votes: Fed 09.02.2003	-1.540***	0.584***
	(0.150)	(0.154)
Popular votes: Fed, Cant 18.05.2003	-0.251	1.763***

	(0.155)	(0.159)
Popular votes: Fed, Cant 08.02.2004	0.058	2.120***
	(0.158)	(0.162)
Popular votes: Fed 16.05.2004	-0.203	1.963***
	(0.160)	(0.164)
Popular votes: Fed, Cant, Comm 26.09.2004	0.714***	2.840***
	(0.162)	(0.167)
Popular votes: Fed, Cant 28.11.2004	0.140	2.385***
	(0.165)	(0.169)
Popular votes: Cant, Comm 24.04.2005	.	.
	.	.
Popular votes: Fed 05.06.2005	0.669***	2.743***
	(0.169)	(0.174)
Popular votes: Fed 25.09.2005	0.605***	2.827***
	(0.172)	(0.176)
Popular votes: Fed, Cant, Comm 10.03.1996	.	.
	.	.
Constant	-0.588	0.080
	(0.553)	(0.583)
lnsig2u		
Constant	0.444***	0.629***
	(0.015)	(0.013)
σ_u (ICC)	1.249***	1.370***
	(0.009)	(0.009)
ρ	0.322***	0.363***
	(0.003)	(0.003)
AIC	426569.1	453967.6
BIC	427073.1	454474.1
Log-Likelihood	-213238.6	-226937.82
N	25'833	26'822
N × T	423'334	446'896

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 2.7: Turnout Across All Votes in Geneva 1996-2005

Dependent Variable: **Voted** *(1 = Yes, 0 = No)*	*Estimate*	*SE*
Voted at t - 1	0.683***	0.008
Voted at t = 0	1.740***	0.061
Female	0.061**	0.019
Native of Geneva	0.125***	0.018
Married	0.119***	0.032
Married at t = 0	0.362	0.310
Married Mean	-0.967***	0.097
Age	-0.204***	0.014
Age at t=0	-0.202***	0.033
Age Mean	0.328***	0.026
Federal Voting Occasion	0.530**	0.166
Federal Voting Occasion at t = 0	0.094	0.065
Federal Voting Occasion Mean	-0.259	0.229
Direct Democratic Vote	0.300***	0.027
Direct Democratic Vote at t = 0	-0.094	0.061
Direct Democratic Vote Mean	-0.359	0.192
Federal Voting Occasion at t = 0 × Direct Democratic Vote at t = 0	-0.172*	0.081
Federal Voting Occasion at t = 0 × Voted at t = 0	-0.097	0.103
Direct Democratic Vote at t = 0 × Voted at t = 0	-0.076	0.092
Direct Democratic Vote at t = 0 × Federal Voting Occasion at t = 0 × Voted at t = 0	0.089	0.126
Constant	-0.593	0.559
Popular votes: Fed, Cant, Comm 09.06.1996	.	.
Popular votes: Fed, Cant, Comm 01.12.1996	-1.330***	0.138
Popular votes: Fed, Cant, Comm 08.06.1997	-1.716***	0.130
Popular votes: Fed, Cant, Comm 28.09.1997	-0.679***	0.125
Elections: Cant 12.10.1997	-1.174***	0.118
Elections: Cant 16.11.1997	-0.380***	0.115
Popular votes: Fed, Cant, Comm 07.06.1998	-0.776***	0.125
Popular votes: Fed, Cant, Comm 27.09.1998	-1.375***	0.125
Popular votes: Fed, Cant 29.11.1998	-1.363***	0.125
Popular votes: Cant, Comm 20.12.1998	-0.569***	0.090
Popular votes: Fed 07.02.1999	-1.713***	0.127
Elections: Comm 28.03.1999	-1.083***	0.095

Popular votes: Fed, Cant 18.04.1999	-2.640***	0.130
Elections: Comm 02.05.1999	-0.908***	0.092
Popular votes: Fed, Cant 13.06.1999	-1.007***	0.129
Popular votes: Cant 26.09.1999	-0.506***	0.078
Elections: Fed 24.10.1999	-1.767***	0.130
Popular votes: Fed, Cant 12.03.2000	-0.938***	0.130
Popular votes: Fed 21.05.2000	-0.225	0.131
Popular votes: Fed, Comm 24.09.2000	-0.721***	0.133
Popular votes: Fed, Cant, Comm 26.11.2000	-1.186***	0.131
Popular votes: Fed, Cant, Comm 04.03.2001	0.156	0.135
Popular votes: Fed 10.06.2001	-1.327***	0.137
Elections: Cant 07.10.2001	-0.860***	0.066
Elections: Cant 11.11.2001	-0.293***	0.062
Popular votes: Fed, Cant, Comm 02.12.2001	-1.065***	0.140
Popular votes: Fed, Cant 03.03.2002	0.100	0.141
Popular votes: Fed, Cant 02.06.2002	-0.473***	0.143
Popular votes: Fed, Cant 22.09.2002	-0.678***	0.144
Popular votes: Cant, Comm 27.10.2002	-0.710***	0.042
Popular votes: Fed, Cant 24.11.2002	-0.456**	0.147
Popular votes: Fed 09.02.2003	-1.542***	0.149
Elections: Fed, Cant 02.03.2003	-0.791***	0.147
Elections: Comm 30.03.2003	-0.174***	0.042
Elections: Comm 04.05.2003	-0.125**	0.041
Popular votes: Fed, Cant 18.05.2003	-0.241	0.154
Elections: Fed 19.10.2003	-0.432**	0.152
Popular votes: Fed, Cant 08.02.2004	0.075	0.157
Popular votes: Fed 16.05.2004	-0.187	0.159
Popular votes: Fed, Cant, Comm 26.09.2004	0.740***	0.161
Popular votes: Fed, Cant 28.11.2004	0.167	0.163
Popular votes: Cant, Comm 24.04.2005	.	.
Popular votes: Fed 05.06.2005	0.701***	0.168
Popular votes: Fed 25.09.2005	0.641***	0.170
Elections: Cant 09.10.2005	.	.
Constant	-0.593	0.559
σ_u (ICC)	1.282***	0.009
ρ	0.333***	0.003
AIC	559274.4	
BIC	559996.3	
Log-Likelihood	-279573.18	
N	26'760	
N × T	585'605	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

3

Much Ado About Nothing? A Quantitative Study of the Impact of Postal Voting on Turnout

Kushtrim Veseli

The introduction of unrestricted postal voting makes it possible for Swiss citizens to vote from the comfort of their homes over a four-week period, reducing voting costs as a consequence. However, evidence from the current study fails to support the conventional view that making voting easier raises turnout. Results from a synthetic control method analysis show that participation levels in Basel-Landschaft and St. Gallen did not increase after the introduction of postal voting in 1978 and 1979, respectively. Similarly, results from a regression discontinuity analysis indicate no positive shift in cantonal level turnout after the implementation of unrestricted postal voting.

3.1 Introduction

In an endeavor to make balloting easier and more convenient for voters, Switzerland, a country with one of the lowest turnout rates among democratic countries [the average turnout rate in referendums and initiatives for 2015 was 43.1 % of eligible voters (see BFS, 2016)], gradually introduced postal voting over the last few decades. Currently, any Swiss citizen can make use of postal voting and most cast their ballot in elections and referendums/initiatives via mail. The first Swiss canton to introduce postal voting was the canton of Basel-Landschaft in 1978, while the last one was the canton of Ticino in 2005.[1] Voting per mail in Switzerland is automatic and unrestricted – meaning that every citizen above age 18 is automatically registered and receives the balloting documents by mail at home. Citizens may also vote at the polling station in person if preferred. The focus of this study is unconditional postal voting, i.e., postal voting for all citizens with no request necessary.

Optional postal voting has made it possible for eligible voters to cast their ballots from the comfort of home. Depending on the nature of the ballot (municipal, cantonal, or federal), citizens vote over a three to four week time span. By sparing the time and cost of going to the polling station, voting is less costly. Thus, the main motivation behind postal voting is to make balloting easier and less costly, hoping that this will increase turnout rates. Adopting the balloting system to current trends, the Swiss cantons of Geneva, Neuchatel and Zurich have even introduced pilot projects allowing for a restricted group of persons to vote via the Internet. In light of these efforts to reform the balloting system it is important to empirically analyze the impact of

[1] It remains unclear as to why some cantons introduced postal voting earlier than others (see also Hodler, Luechinger and Stutzer, 2015, p. 152). The existing literature and newspaper articles do not report any important political event concurring with the staggered implementation of postal voting across cantons.

similar mechanisms on turnout, such as postal voting.

One limitation of the postal voting literature to date is that it has focused solely on elections for political office (but see Luechinger, Rosinger and Stutzer, 2007). Another limitation is that the literature reports wildly fluctuating turnover effects across studies, ranging from a low of -13.2 to a high of 26.5 percentage points (see, for example, the studies of Bergman and Yates, 2011; Karp and Banducci, 2000). Furthermore, it is unclear if a reduction of voting costs in the form of postal voting operates similarly in the case of direct democratic voting.

At first, it would seem obvious that reducing voting costs should result in higher turnout. Voting by mail is more convenient than voting at a polling station, and citizens are not prevented from going to the polls because of reasons of force majeure. Upon further consideration, it is not so obvious whether postal voting reduces voting costs enough so that it has a significant impact on voter turnout. Going to the polling station on a referendum day is relatively low in terms of opportunity costs. It seems quite absurd to make opportunity costs responsible for low voter turnout among citizens, while naturally everyone takes time out during the day for various non-work activities (Niemi, 1976, p. 115). Driving to the polling station on a Sunday every now and then, accounts only for a small fraction of the overall costs of voting - the majority of costs may arise from cognitive efforts to process the information about the votes at hand.

This study explores the question of whether or not the implementation of an optional unrestricted postal voting system has led to higher voter turnout in Switzerland. The contribution of this study to the existing literature is twofold: First, it investigates the effect of postal voting on turnout in the context of direct democratic votes, while all previous studies focused on elections for political office (for an exception see Luechinger, Rosinger and Stutzer, 2007). Second, it more effectively exploits tem-

poral variation in canton-level implementation of this electoral reform and offers an improved design for investigating whether there is a causal link between postal voting and voter turnout in direct democratic votes.

The study is organized as follows: Section 3.2 briefly discusses the theoretical expectations of the relationship between voting costs and turnout. Section 3.3 explores the existing postal voting literature. Section 3.4 describes the data and methodological challenges of studying the impact of postal voting on voter turnout. The results are presented in section 3.5, and conclusions are presented in section 3.6.

3.2 Theoretical Expectations

3.2.1 A Modified Downsian Model

A number of published studies attempt to describe the impact of voting costs on participation rates, with the first serious discussions and analyses emerging during the 1950s authored by Anthony Downs (1957). Subsequent studies focused on the various costs of voting (e.g., Piven and Cloward, 1988; Teixeira, 1992; Wolfinger and Rosenstone, 1980). This study analyzes only the effect of postal voting on turnout.

Participation rates are influenced by costs and benefits - if the costs of voting are high and the benefits low, many people will not cast their ballot (Downs, 1957). Behavioral economists blame abstention on the costs of voting by arguing that non-voting citizens are actually acting rationally because, low costs notwithstanding, the chances that one's vote could affect the outcome of an election is almost zero, so that the costs associated with voting will normally outweigh the expected benefits (Downs, 1957; Riker and Ordeshook, 1968). Benefits are usually divided into two groups; collective benefits such as influencing the outcome or helping an initiative or referendum initiated by one's preferred party gain approval, and individual benefits such as fulfilling

civic duties (e.g., being a good citizen) and other non-material benefits. Costs of voting are associated with information costs, plus time and other costs incurred to get to the polling station on a referendum day. Accordingly, the decision to vote or not can be described as a function of benefits weighed against the cost of voting (Downs, 1957; Riker and Ordeshook, 1968). A theoretical utility function for voting is expressed by the following formula (Riker and Ordeshook, 1968):

$$p \times B + D - C,$$

where p denotes the probability that the individual vote is pivotal, B denotes the expected collective benefits, D denotes the individual benefits, and C denotes the costs associated with voting. Based on this theoretical model, a citizen will vote only if the benefits of voting exceed the costs, i.e., $p \times B + D > C$. This model makes it obvious that authorities cannot influence any of the parameters in the model, apart from C, i.e., voting costs. Therefore, in order to increase voter turnout rates, it is important to decrease the costs citizens associate with voting (McDonald and Popkin, 2001; Rosenstone and Hansen, 1993; Wolfinger and Rosenstone, 1980). Unrestricted postal voting is intended to partly reduce the voting costs and boost turnout rates among potential voters by automatically sending each eligible voter a ballot at home.

3.2.2 Exaggerated Expectations?

It is important to note that physically getting to the polling station on a ballot Sunday accounts only for a small fraction of the overall costs of voting. As mentioned above, the term C may be divided into two main categories: the logistical costs of voting, including opportunity costs, and costs that are comprised of the cognitive effort and time spent learning about the choices available on a specific referendum day, i.e., information costs. While the introduction of unrestricted optional postal voting might

lower the logistical costs of voting, it fails to impact in any way the second component of the term C, namely the information costs due to cognitive effort.

A major point of this study rests on the assumption that logistical costs are relatively low, while information costs may account for the biggest share of the overall voting cost. This holds true especially for Switzerland, where being informed about voting issues is often far more costly than the act of voting itself. Referendums and initiatives are an inseparable part of the Swiss political landscape, with an average of four ballot Sundays occurring each year. On each ballot Sunday, citizens are invited to cast their ballot for an average of three to five referendums/initiatives, many of these low-stimulus. Thus, collecting general information, ascertaining the position of the preferred party, and building an opinion about so many issues every year carries a far higher cost than physically going to the polling station. In Switzerland, virtually all polling places lie within 20-30 minutes of one's place of residence. This implies that the term C in the above-mentioned Riker and Ordeshook (1968) voting equation remains practically the same, despite the availability of an option to cast the ballot per mail.

Given that information costs remain the same, this study argues that despite the lowering of logistical costs by optional mail balloting, there is no compelling reason to assume an increase in participation rates. This argument is supported by empirical evidence, presented in section 3.5.

3.3 Literature Review

Despite a number of research studies in the field of pre-election day voting, the empirical evidence as to whether the introduction of postal voting has increased the turnout is inconclusive. Some studies report that postal voting has not led to higher

turnout (Bergman and Yates, 2011; Funk, 2010; Kousser and Mullin, 2007; Rallings, Thrasher and Borisyuk, 2010). Other findings suggest just the opposite i.e., postal voting has increased voter participation in election for political office (Berinsky, Burns and Traugott, 2001; Gerber, Huber and Hill, 2013; Gronke, Galanes-Rosenbaum and Miller, 2007; Larocca and Klemanski, 2011; Magleby, 1987; Richey, 2008; Southwell and Burchett, 2000), and federal referendums (Luechinger, Rosinger and Stutzer, 2007; Hodler, Luechinger and Stutzer, 2015).[2] Furthermore, numerous previous studies find mixed evidence, i.e., positive and negative effects of postal voting on turnout, depending on the election type (Gronke and Miller, 2012; Southwell, 2009). A great deal of U.S. based research focuses on the impact of all-mail voting in the State of Oregon (e.g., Berinsky, Burns and Traugott, 2001; Karp and Banducci, 2000; Southwell and Burchett, 2000), with some exceptions such as Gerber, Huber and Hill (2013), studying county-level implementation of all-mail elections in Washington State, and Bergman and Yates (2011) and Kousser and Mullin (2007), investigating elections in the California, where registrants in less populous precincts are assigned to vote by mail.[3] In a nutshell, the evidence that postal voting is associated with higher voter turnout is inconclusive, as point estimates vary strongly across studies, ranging from -13.2 to 26.5 percentage points.[4]

Funk (2010) examines the impact of postal voting on turnout in Switzerland. She analyzes the effect of optional postal voting on voter participation at national parliamentary elections in Switzerland during the period 1971-2003. The results from this study suggest that the introduction of postal voting did not significantly increase

[2]Luechinger, Rosinger and Stutzer (2007) and Hodler, Luechinger and Stutzer (2015) conduct virtually the same analysis in estimating the effect of postal voting on turnout. The discussion about these estimates in Hodler, Luechinger and Stutzer (2015) abbreviates the discussion in Luechinger, Rosinger and Stutzer (2007).

[3]Registered voters in the States of Oregon and Washington can only cast ballots by mail; voting at the polling station is not an option anymore.

[4]See, for example, the studies of Bergman and Yates (2011) and Karp and Banducci (2000).

the turnout in elections for political office. Further, she reports that different-sized communities reacted differently to the introduction of postal voting, with smaller communities tending to participate less once postal voting was introduced.

Studies similar to the current one are authored by Luechinger, Rosinger and Stutzer (2007) and Hodler, Luechinger and Stutzer (2015). Using fixed-effects models, Luechinger, Rosinger and Stutzer (2007) studied the effect of postal voting on turnout in national ballots at cantonal level and found an estimated average effect of 4.1 percentage points for an average turnout of 43 %. Their data consists of 107 federal ballot dates held between 1970 and 2005. Very similarly to Luechinger, Rosinger and Stutzer (2007) and using the same modeling strategy, but this time with two additional control variables at cantonal level, Hodler, Luechinger and Stutzer (2015) investigate the effect of postal voting on cantonal turnout in 90 federal ballot dates during the period 1980-2010. They report an average boost on turnout of 4.7 percentage points, or 10.8% relative to the average turnout of 43.7%. Furthermore, Hodler, Luechinger and Stutzer (2015) find that the introduction of postal voting in Switzerland has "decreased" the average education and political knowledge of participants by 0.067 years.

Nevertheless, neither study can make a causal link between the introduction of postal voting and turnout. Both studies assume only time-invariant unobserved heterogeneity,[5] and this assumption is less valid as the panel time span lengthens (Schmidt and Sickles, 1984). As both papers analyze the effect of postal voting on voter participation over a time-span of 30-35 years, it is likely that the occurrence of exogenous shocks vary across both cantons and over time. If this is true, the estimates of both studies might be biased. The current study avoids this problem through the implementation of a causal inference approach, where voter participation levels in all cantons

[5]Both studies control for time-invariant unobserved heterogeneity by using canton-specific, ballot date-specific, and canton-specific time trends.

are simultaneously investigated just before and after the introduction of postal voting. Another weakness of both these prior works is that their modelling strategy cannot really exploit the staggered implementation of postal voting in Swiss cantons, at all. This is something I address in the following section.

3.4 Methodology

3.4.1 Data

The data used in this study come from the official records of Swiss Federal Statistical Office (FSO) and the database of the Research Center for Social and Economic History at the University of Zurich. These data are not protected by Swiss privacy and data protection laws and are publicly available.[6] The database containing the exact dates when unrestricted optional postal voting was introduced in each of the 26 Swiss cantons comes from Luechinger, Rosinger and Stutzer (2007).

The collected data span the period 1970-2010 and include the average turnout at the cantonal level on 122 referendum/initiative days, also called ballot Sundays. The data on turnout have a daily resolution. On a particular ballot Sunday, there may be multiple initiatives and/or referendums; the average turnout is calculated per canton and referendum/initiative day. The data also include a set of covariates thought to influence turnout, specifically unemployment rate at cantonal level, population size, share of people younger than 20, and older than 64.[7] Basic descriptive statistics for all the variables can be found in Table 3.1.

Switzerland consists of 26 cantons, each with their own constitution.[8] The major-

[6]See `http://www.bfs.admin.ch/bfs/portal/de/index/themen/17/03/blank/data/01.html`. Retrived on 02.05.2016.

[7]Missing data on covariates were obtained by linear interpolation.

[8]The canton of Jura was created in 1979. The observation period of this study starts in 1970. Therefore, the canton of Jura is not part of the analyses.

Table 3.1: Descriptive Statistics

	Mean	*SD*
Turnout (%)	43.96	12.19
Unemployment Rate (%)	1.66	1.73
Population (in thousands)	270.23	278.42
Age $\geq$ 65 (%)	0.15	0.02
Age $<$ 20 (%)	0.26	0.05
Number of Cantons	25	
Number of Federal Votes (1970-2010)	122	
$N \times T$	3050	

ity of Swiss cantons already introduced some form of postal voting during the 1960s, allowing certain groups of population, who for various reasons were unable to go to the polling station, to cast ballots by mail.[9] In 1976 a federal law called upon all cantons to establish a system for postal voting.[10] This law was finally amended in 1994 and mandated that all cantons establish an unrestricted postal voting system. However, the law did not specify a deadline, leading to further delays in establishing the new policy. Altogether, the implementation process of a facilitated and unrestricted postal voting system spanned 27 years. The first canton to introduce unrestricted postal voting was the canton of Basel-Landschaft in 1978, followed by St. Gallen and Appenzell-Innerrhoden in 1979. The last cantons to establish unrestricted postal voting systems were the cantons of Valais and Ticino (see Table 3.2). Nowadays, voting by mail has become a matter of course in Switzerland, where more than 85 % of those who vote cast their ballot by mail (OSCE, 2011, p. 14).

[9] Art. 5–6 Bundesgesetz über die Einführung von Erleichterungen der Stimmabgabe an eidgenössischen Wahlen und Abstimmungen from 25. June 1965, effective since 1. January 1967.

[10] Art. 5, 8 Bundesgesetz über die politischen Rechte from 17. December 1976, effective since 1. July 1978, amended on 18. March 1994, effective since 15. December 1994.

Table 3.2: Staggered Implementation of Postal Voting at Cantonal Level

Canton	*Introduction Date*
Basel-Landschaft (BL)	01.07.1978
St. Gallen (SG)	01.05.1979
Appenzell Innerrhoden (AI)	11.06.1979
Solothurn (SO)	01.01.1985
Thurgau (TG)	01.08.1985
Appenzell Ausserrhoden (AR)	24.05.1988
Bern (BE)	01.07.1991
Aargau (AG)	01.01.1993
Nidwalden (NW)	29.06.1994
Luzern (LU)	01.10.1994
Zürich (ZH)	01.10.1994
Basel-Stadt (BS)	30.12.1994
Geneva (GE)	01.01.1995
Graubünden (GR)	01.01.1995
Uri (UR)	01.01.1995
Fribourg (FR)	23.05.1995
Glarus (GL)	01.07.1995
Schaffhausen (SH)	01.08.1995
Obwalden (OW)	01.12.1995
Zug (ZG)	01.04.1997
Schwyz (SZ)	01.01.2000
Neuchatel (NE)	01.01.2001
Vaud (VD)	25.03.2002
Valais (VS)	01.01.2005
Ticino (TI)	15.04.2005

Source: Luechinger, Rosinger and Stutzer (2007).

3.4.2 Methods

The introduction of postal voting in Switzerland was implemented at the cantonal level, with each Swiss canton introducing this electoral reform at a different time-point. This study aims to analyze the turnout rates before and after the introduction of postal voting and find out whether the implementation of this new policy resulted in effectively higher turnout in federal referendums. The majority of past studies

assessed the impact of postal voting on turnout via ordinary least squares or fixed effects regression estimation. Gerber, Huber and Hill (2013) and Funk (2010), used a differences-in-differences approach and Kousser and Mullin (2007), used a matching approach. The current study follows modeling strategies allowing for control of omitted time-varying factors, better suited to exploiting the staggered implementation of postal voting in Swiss cantons. Another advantage of the modeling strategies used in this study is that they do not assume a homogeneous treatment effect, as is the case with the fixed effects estimator. The current study relies on the synthetic control method and a special form of the regression discontinuity design to estimate the effects of the unrestricted postal voting in Switzerland. In comparison to other approaches, both modeling strategies make relatively weak identifying assumptions and allow for time-varying effects of omitted variables. The two approaches complement one another; the regression discontinuity design captures the changes around the implementation date in all cantons, while the synthetic control method enables a deep look into longer-term effects. Both identification strategies are described in the following subsections.

3.4.2.1 Identification Strategy I: Synthetic Control Method Approach

The synthetic control method approach, introduced by Abadie and Gardeazabal (2003) and further developed by Abadie, Diamond and Hainmueller (2010), allows for effect estimation where single units are exposed to an event of intervention. As can be seen from Table 3.2, Basel-Landschaft and St. Gallen were the first cantons to introduce unconditional postal voting in 1978 and 1979, respectively. There are few cantons which introduced postal voting fairly early and a large share of remaining cantons implementing the same policy only after about 14 years. Thus, Basel-Landschaft and St. Gallen are ideal cases for study of the impact of postal voting on turnout by using

the synthetic control method approach.

In the first step a synthetic double of each of the two cantons is constructed as a weighted average of other Swiss cantons, where the policy change (i.e., introduction of postal voting) has not yet occurred. The weights are chosen in such way, so the synthetic region closest to the unit of analysis (in this case the cantons of Basel-Landschaft and St. Gallen) resembles the actual cantons before the introduction of postal voting. This can be implemented in the following way: Let X_1 be a vector of variables that measure characteristics of the treated canton before the introduction of postal voting. Let X_0 be the corresponding matrix of the same variables for the j possible control cantons. Then the $(j \times 1)$ weight vector $W = (w_2, ..., w_{j+1})$ is chosen to minimize $\sqrt{(X_1 - X_0W)'V(X_1 - X_0W)}$, where V is a diagonal $(k \times k)$ symmetric and positive semi-definite matrix reflecting the importance of the different X's (Abadie, Diamond and Hainmueller, 2010, p. 496).[11] In the next step a counterfactual outcome $Y_1 = Y_0W$ is created, where Y_0 is the outcome matrix for the control cantons. Finally, comparison of the actual outcome to the counterfactual provides the estimated treatment effect (see Abadie, Diamond and Hainmueller, 2010).

However, it is important to note that the synthetic control method approach is, of course not suitable to measure the impact of postal voting on turnout across all Swiss cantons. Firstly, with time, canton after canton implemented the new policy, thus making the donor pool for the control group ever smaller. Secondly, it is not always possible to create a synthetic counterpart for each canton even if the donor pool is relatively large. Some cantons may have peculiarities influencing their voter turnout that cannot be simulated by any weighted combination of another canton's turnout trends. This is for example the case with the canton of Appenzell-Innerrhoden.

[11] Each particular value of the vector W represents a potential synthetic control (Abadie, Diamond and Hainmueller, 2010, p. 495).

Although this canton introduced unrestricted postal voting just one month after St. Gallen, it was not possible to reproduce its pre-treatment turnout trend precisely enough (see Figure 3.6 in Appendix).

3.4.2.2 Identification Strategy II: Regression Discontinuity Design

An additional identification strategy used in this study to investigate the effect of postal voting on turnout, is a special form of sharp regression discontinuity design. A special form, because the running variable in this RDD model (z_i) consists of referendum days; in other words, time serves as the assignment variable for the treatment. Even though relying on time as a forcing variable seems somewhat unusual in this kind of framework, recently this setup has found broad use in the literature (for studies in the same spirit see Auffhammer and Kellogg, 2011; Davis, 2008; Foreman, 2013).

To simplify, the sharp RD design exploits the fact that treatment status T_i is a deterministic and discontinuous function of the assignment variable z_i. Accordingly, $T_i = \begin{cases} 1, & z_i \geq z_0 \\ 0, & z_i < z_0 \end{cases}$, where z_0 is the corresponding introduction date of postal voting for each canton in Switzerland. The assignment variable z_i consists of time-points each denoting a referendum Sunday, while the treatment variable is a dummy variable equal to 1 when the time trend is on or after the introduction of postal voting in the corresponding cantons and 0 otherwise. Because the date of the introduction of postal voting varies across cantons, the assignment variable z_i has been constructed in such way, so the pre-treatment and treatment periods for all cantons are denoted by $z < 0$ and $z \geq 0$, respectively.

The regression discontinuity design controls for possible confounding factors by restricting the sample to a relatively narrow time window around the introduction of postal voting, provided that treatment assignment is random at the threshold for

treatment. Furthermore, it permits unobserved factors to act nonlinearly over time, as long as they are not discontinuous when the postal voting system was implemented (Hahn, Todd and Klaauw, 2001). Another central assumption of RDD model is that other covariates are smooth functions of the assignment variable conditional on treatment (Nichols, 2009, p. 61). The dependent variable should jump at the cutoff only due to the discontinuity in the level of treatment (Nichols, 2009, p. 61). The central question is whether these assumptions hold true in the framework of the current study. The main identification difficulty here lies in the fact that the voting subject of federal referendums changes over time and thus turnout is influenced by the salience of the vote at hand. However, this problem may be neutralized by exploiting the staggered implementation of postal voting across cantons. This is possible because the policy was introduced in the corresponding cantons at 19 different time-points during the period 1978-2005. Consequently, each bin in the assignment variable z_i consists of cantonal turnout at 19 different ballot Sundays. Hence, it is assumed that the assignment procedure of the treatment neutralizes the influence of high-stimulus votes on the outcome variable on both sides of the threshold for treatment. In other words, it is expected that on average both high and low salience votes are equally distributed on both sides of the cutoff. In order to test whether this assumption holds, a residual is calculated for all 19 different time-points, in which the postal voting was introduced in the corresponding cantons. The residual is calculated by subtracting the mean voter turnout over five federal referendums in the treatment period from the mean turnout over five federal referendums in the pre-treatment period. The mean of the residual is 1.42 %, which, considering the high turnout volatility over federal votes, is relatively small. This deviation implies that low and high stimulus votes are not perfectly and randomly distributed on both sides of the cutoff. However, taking into consideration that this deviation is on average only 1.42 percentage points it should not hinder the

RD model to identify a possible effect, especially because, according to a part of the existing literature the expected impact of postal voting on turnout should be good above 4 percentage points.

The estimated treatment effect in the sharp RD model is just the jump in expected outcomes at the cutoff. The local-polynomial regression-discontinuity point estimator of LATE is simply: $LATE = y^{z_i \geq z_0} - y^{z_i < z_0}$ (Nichols, 2009, p. 66). In other words, the expected outcome for units just below the cutoff, untreated, but otherwise identical, are subtracted from the expected outcome for units just above the cutoff that are treated (Nichols, 2009, p. 66-68).

The choice of the function of the assignment variable z for treatment and outcomes has provoked a considerable debate in the literature. While some authors prefer to use high-order polynomials of z to estimate separately on both sides of the cutoff, other authors warn that doing so may result in false conclusions about the size or even the existence of an effect (see Gelman and Imbens, 2014; Gelman and Zelizer, 2015). However, the existing literature has not yet delivered clear arguments as to whether or when researchers should use a high-order polynomial, local polynomial, local linear, or local mean smoother. The best solution here seems to be, conducting the same analysis with several smoothers and report whether the estimates are sensitive to the choice of the function of the assignment variable z. The same holds true for the choice of bandwidths. Because different bandwidth choices may result in different estimates, this study reports three estimates, i.e., the preferred bandwidth estimate as given by Gelman and Imbens (2014), and estimates using twice and half the preferred bandwidth (Nichols, 2009, p. 80).

3.5 Results

3.5.1 The Effect of Unrestricted Postal Voting on Turnout: The Cases of Basel-Landschaft and St. Gallen

This section reports the results from the synthetic control method analysis. To evaluate the effect of postal voting on turnout in a specific canton the central question is how turnout would have evolved in the treatment period in the absence of the unrestricted postal voting system. The synthetic control method serves as an adequate tool to estimate this counterfactual.

The Swiss canton of Basel-Landschaft was the first canton to implement unrestricted optional postal voting in July 1978. As mentioned in section 3.4, the synthetic Basel-Landschaft is constructed as a weighted combination of cantons in the donor pool most closely resembling Basel-Landschaft before automatic postal voting was introduced. The corresponding pre-treatment period for Basel-Landschaft starts in February 1970 and ends in May 1978, encompassing 27 referendum/initiative days. The treatment period starts in September 1978 and ends in December 1992, encompassing 38 referendum/initiative days. The cantons of St. Gallen, Appenzell-Innerrhoden, Solothurn, Thurgau, Appenzell-Ausserrhoden, and Bern are excluded from the donor pool, because these cantons implemented postal voting systems themselves during the period May 1979 - July 1991. Consequently, there are 18 cantons left in the donor pool. As can be seen from Table 3.5 in the Appendix, the weights for turnout averages in the synthetic Basel-Landschaft come from a small subset of potential donors, namely Basel-Stadt (0.238), Geneva (0.165), Neuchatel (0.136), Obwalden (0.208), Schaffhausen (0.091), Ticino (0.153), and Valais (0.009). This is, however, nothing unusual among applications using the synthetic control method.

Figure 3.1 plots the turnout trajectory of Basel-Landschaft and its synthetic coun-

terpart for the period February 1970 - December 1992, during which time were organized 66 referendum/initiative days. The black dashed line on the time line (ballot Sunday 28) marks the beginning of the unrestricted postal voting in the canton of Basel-Landschaft. Notwithstanding the vast volatility in turnout rates across federal referendums/initiatives, the synthetic Basel-Landschaft almost exactly reproduces the trend of voter participation in the actual Basel-Landschaft for the entire pre-treatment period. The good quality of the resemblance is expressed by the relatively small mean squared error of 2.598 % (see Table 3.5 in the Appendix). Thus, it is assumed that in the absence of an unrestricted postal voting system, the turnout levels would have equaled those in the synthetic Basel-Landschaft. In the pre-treatment period the average turnout in the canton of Basel-Landschaft and its synthetic counterpart was 40.66 % and 40.47 %, respectively (see Table 3.6 in the Appendix). This indicates the high precision with which the synthetic Basel-Landschaft reproduces the pre-treatment turnout rates of the actual canton. In the treatment period, the gap between the actual and synthetic Basel-Landschaft is supposed to depict the causal effect of postal voting on turnout. Figure 3.1 shows that after the implementation of unrestricted postal voting in July 1978 the average turnout levels remained virtually the same. In the treatment period the average turnout in Basel-Landschaft was 43.61 %, while its synthetic control averaged at 42.29 % (see Table 3.6 in the Appendix). Considering the turnout trends in the treated and synthetic unit immediately after the introduction of postal voting, there does not seem to be any significant impact attributable to the new policy.

Furthermore, the turnout trend lines cross each other several times in the treatment period, suggesting that there was neither a systematic nor a positive response to the introduction of postal voting in the canton of Basel-Landschaft. These findings go against previous claims that the implementation of postal voting has resulted in a

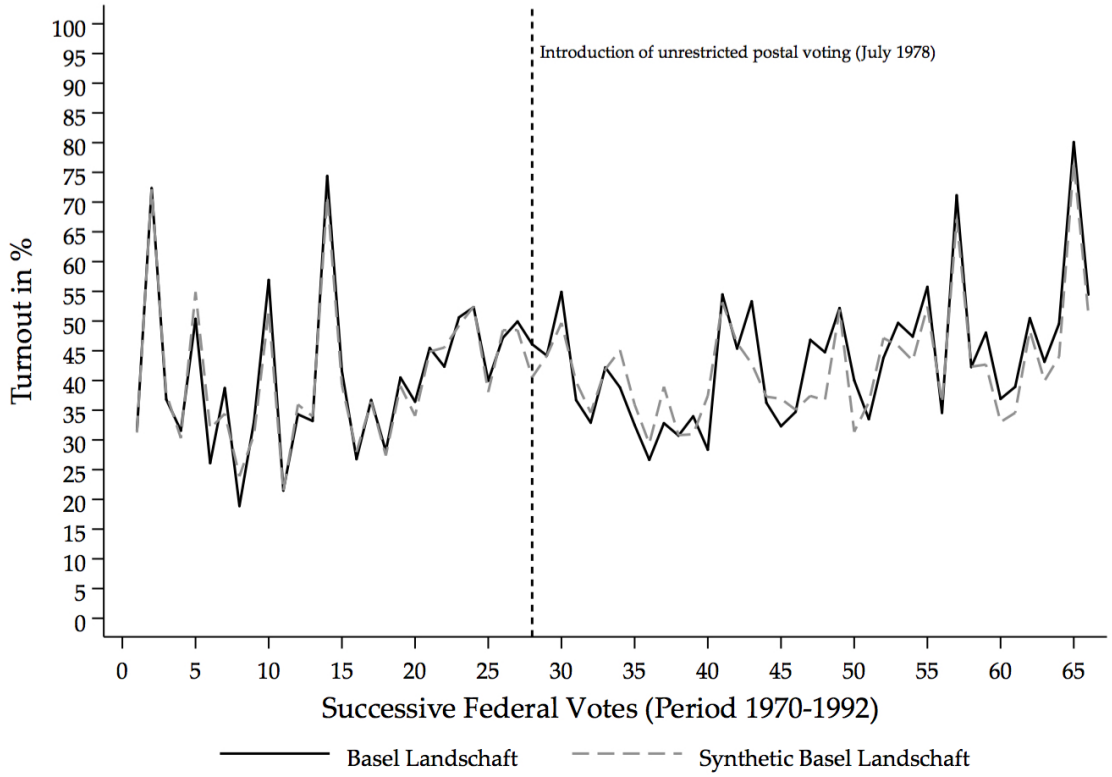

Figure 3.1: Trends in Voter Participation. Basel-Landschaft vs. Synthetic Basel-Landschaft

constant and positive shift in voter turnout (e.g., Luechinger, Rosinger and Stutzer, 2007).

In order to assess if these findings are specific to the canton of Basel-Landschaft, the same analysis is conducted for the canton of St. Gallen. As can be seen from Table 3.2, St. Gallen was the second canton to introduce the unrestricted postal voting system. Starting in May 1979 all citizens of this canton automatically received voting documents per mail and are allowed to cast ballots from home. Just as in the case of Basel-Landschaft, the synthetic St. Gallen is constructed as a weighted combination of cantons in the donor pool that most closely reproduce the turnout trend in St. Gallen before the implementation of the unrestricted postal voting system.[12] The corresponding pre-treatment period for St. Gallen starts in February 1970 and ends in February 1979, encompassing 30 referendum/initiative days. The treatment period starts in May 1979 and ends in December 1992, encompassing 35 referendum/initiative days. The cantons of Basel-Landschaft, Appenzell-Innerrhoden, Solothurn, Thurgau, Appenzell-Ausserrhoden, and Bern are excluded from the donor pool, as these cantons implemented postal voting themselves during the period July 1978 - July 1991. In the donor pool are contained 18 cantons and the positive weights for turnout averages in the synthetic St. Gallen consist of Aargau (0.182), Basel-Stadt (0.043), Geneva (0.020), Graubunden (0.438), Nidwalden (0.197), Schwyz (0.012), Zug (0.016) and Zurich (0.092) (see Table 3.7 in the Appendix).

The turnout trends of St. Gallen and its synthetic counterpart for the 1970-1992 period are plotted in Figure 3.2. The black dashed line on the time line (ballot Sunday 31) marks the beginning of unrestricted postal voting. Again, despite the wild fluctuations in the salience of issues across referendums/initiatives, the turnout

[12]The referendum day of 26. September 1976 was dropped from the analysis, because on this day took place two other high-stimulus referendums at the cantonal level, in which, in comparison to other cantons, the voter turnout was unusually high.

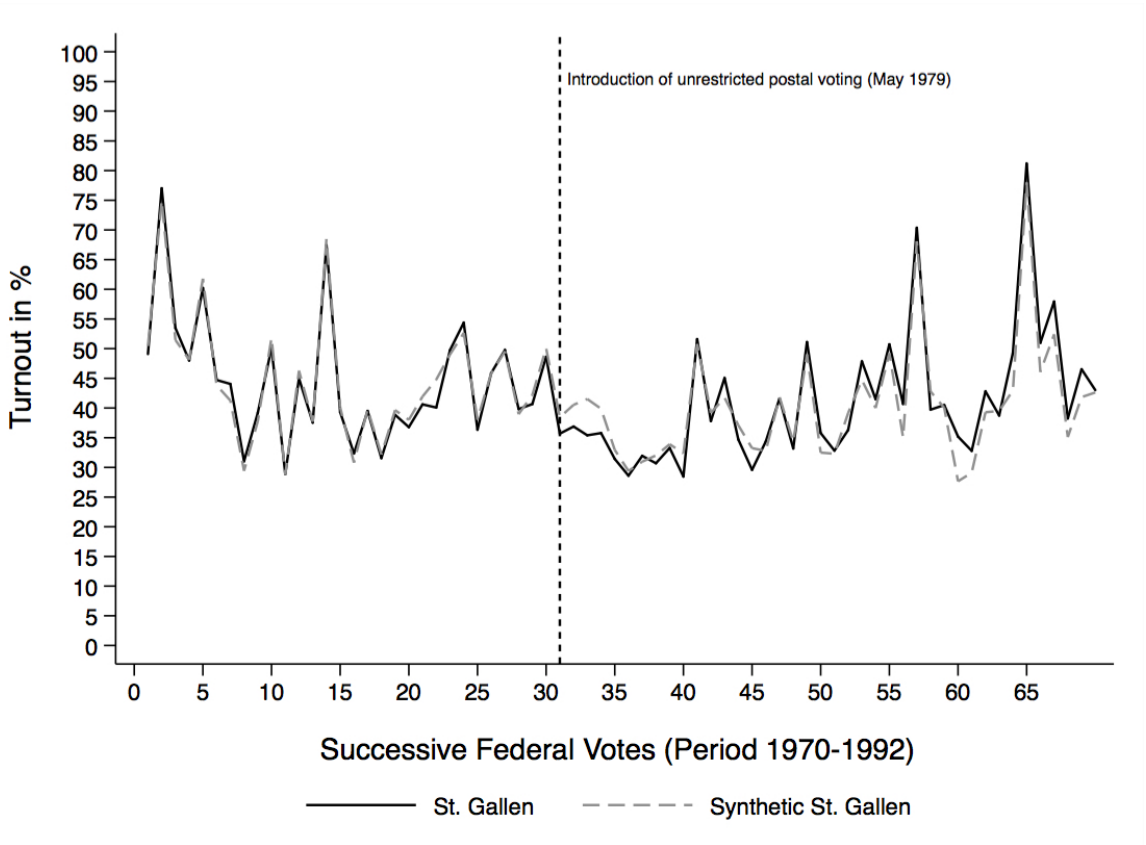

Figure 3.2: Trends in Voter Participation. St. Gallen vs. Synthetic St. Gallen

trend in the pre-treatment period is simulated by the synthetic St. Gallen with large precision. Voter turnout in the synthetic control group and in the actual canton differ only slightly during the pre-treatment period, as they exhibited average turnout rates of 44.67 % and 44.82 %, respectively (see Table 3.8 in the Appendix). The good quality of the approximation is also expressed by the small mean squared error of 1.551 % (see Table 3.7 in the Appendix). Surprisingly, the results report a drop in turnout immediately after the introduction of postal voting in May 1979. This trend lasted about 5 years or until May 1984, when the turnout rates of the actual and synthetic St. Gallen started to converge again. This drop in turnout at cutoff is, however, not clearly attributable to the introduction of postal voting in St. Gallen. Figure 3.3 plots the turnout trends across all cantons, where the black line depicts voter turnout in St. Gallen and grey lines depict turnout in other cantons. The figure shows that the turnout decrease immediately after the implementation of postal voting is not specific to the canton of St. Gallen. Although the drop in turnout in the canton of St. Gallen was bigger than the average drop in the rest of cantons, there are a few cantons with a similar or even a bigger drop in turnout during that same period (see Figure 3.3). Most probably this larger than average long-term decrease in turnout in the canton of St. Gallen is due to a rather unusual and random constellation of a long series of low-stimulus votes at the federal and cantonal/communal levels that took place during the period 1979-1984 (ballot Sundays 31-42).

The findings in the canton of St. Gallen cannot support previous claims that postal voting has had a positive and long-standing impact on cantonal turnout. To sum up, these results differ from the estimates reported by Luechinger, Rosinger and Stutzer (2007) regarding the effect of postal voting on turnout, but they are broadly consistent with the findings from Funk (2010). This inconsistency in results can probably be attributed to the fact that Luechinger, Rosinger and Stutzer (2007) assume ho-

mogeneous treatment effect, which is an assumption that unobserved confounders remain constant over time and across cantons. However, the current analysis shows that this cannot be the case. If we are to believe the results from both the current and Luechinger, Rosinger and Stutzer (2007) study, the implication would be that the overall positive effect of postal voting on turnout is carried by other cantons but not Basel-Landschaft and St. Gallen. Nevertheless, the theoretical expectations are actually very clear; if voting costs are reduced, more people will vote. There is no compelling reason why this would hold true for some cantons but not for the others.

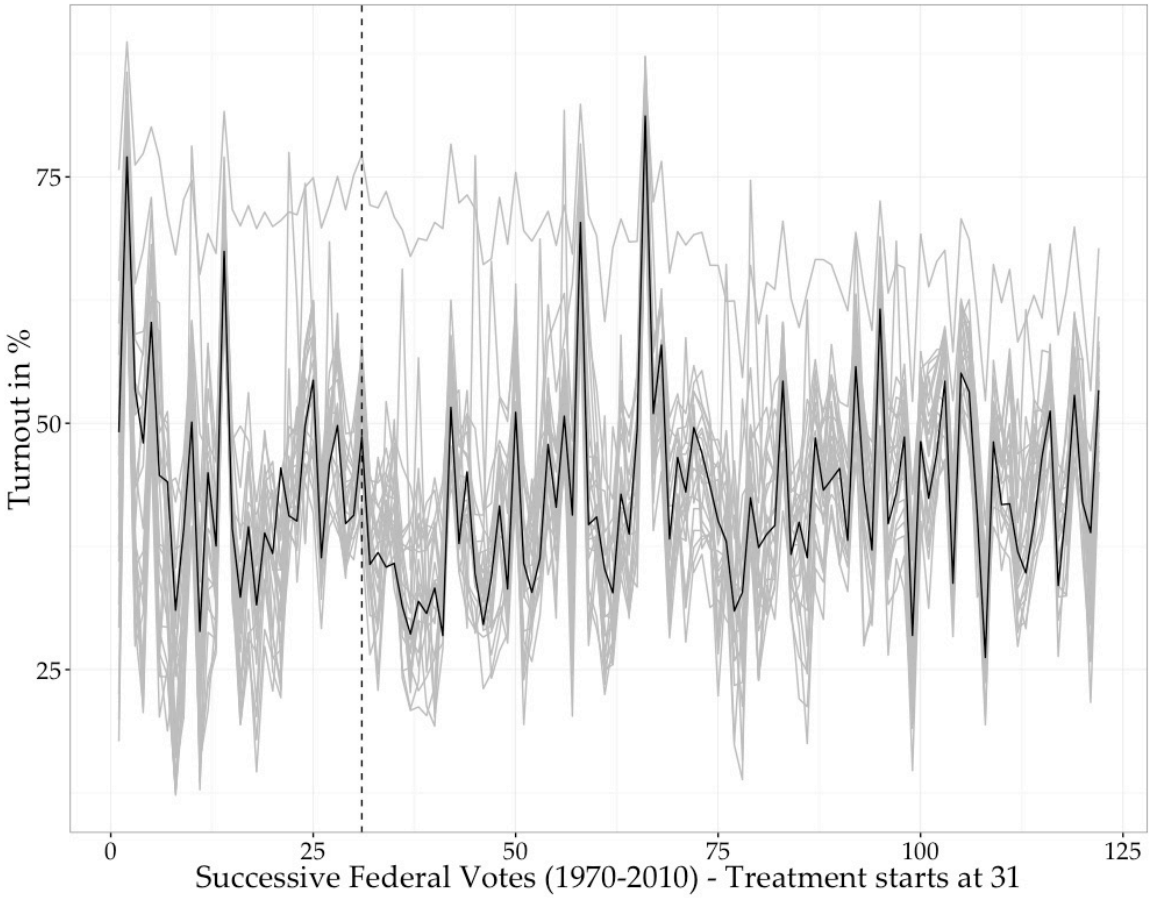

Figure 3.3: Average Voter Turnout in St. Gallen (black line) and the other Swiss Cantons

3.5.2 The Effect of Postal Voting on Turnout: Evidence from an RDD Approach

In order to assess — among other things — whether the results from the synthetic control method are stable across alternative identification strategies, a set of regression discontinuity estimations was implemented using the same data. In a regression discontinuity setup, the estimates are sensitive to the choice of bandwidth, so several estimates are constructed using different bandwidths. The default bandwidth is chosen as proposed by Imbens and Kalyanaraman (2012). Figure 3.4 plots the turnout rate of each canton over the last 14 federal referendums/initiatives in the corresponding pre-treatment period and the first 15 referendums/initiatives in the treatment period. The dots denote turnout bins plotted against their mid-points. The red and green lines denote kernel-weighted local polynomial regressions of turnout on both sides of the corresponding implementation date of unrestricted postal voting. The smoother uses a triangle kernel and the default bandwidth as given by Imbens and Kalyanaraman (2012) is 7.14.

The graphs in Figure 3.4 display a small jump in turnout that might be attributable to the introduction of postal voting. The graph located in the lower right part of the Figure 3.4 shows the size and confidence intervals of local-polynomial estimates versus three different bandwidths. As can be seen from Table 3.3 and Figure 3.4, depending on the size of the bandwidths the estimated effects vary from -0.10 to 1.11 percentage points, however none of the estimates are statistically significant. Furthermore, Figure 3.7 in the Appendix shows that other covariates in the model are smooth functions of the assignment variable and do not jump at the threshold for treatment.

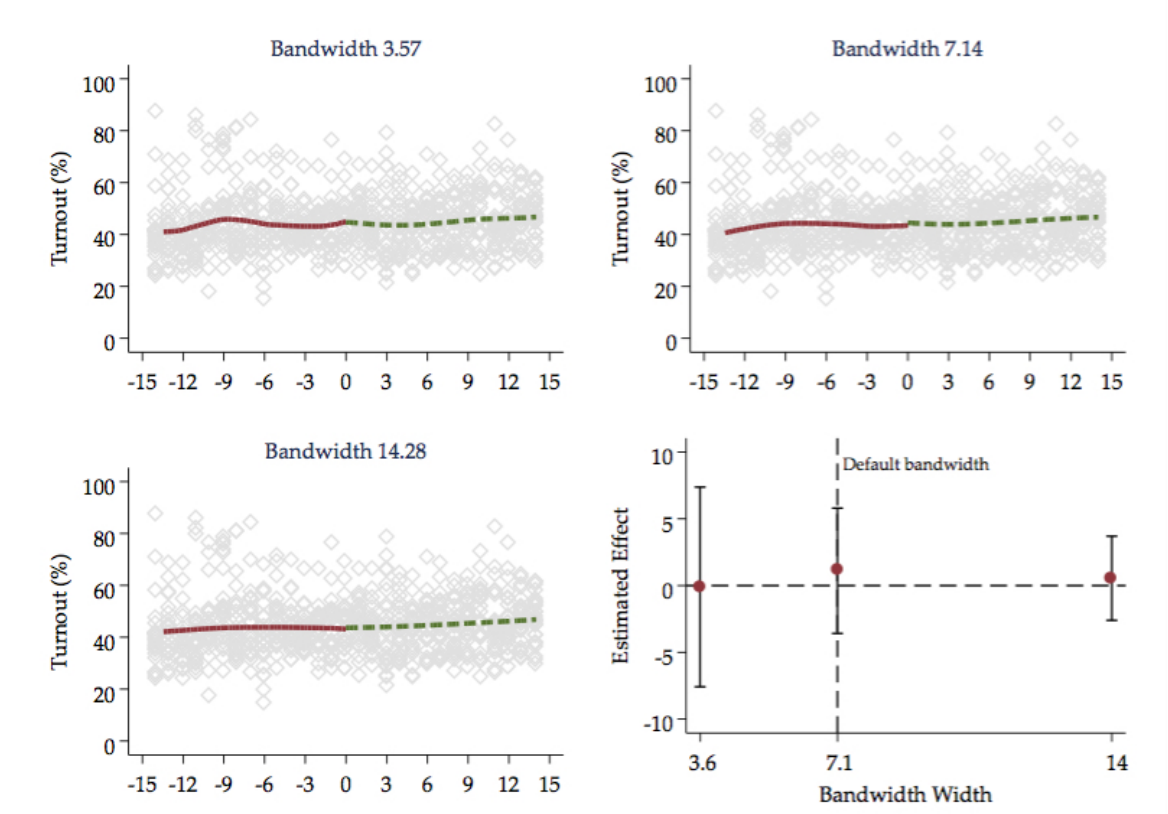

Figure 3.4: Estimated Effects of Postal Voting on Turnout: Kernel-Weighted Local Polynomial

Table 3.3: Local-Polynomial Regression-Discontinuity Point Estimators

Turnout in %	IK Optimal Bandwidth (7.14)	Half Bandwidth (3.57)	Twice Bandwidth (14.28)
Coefficient	1.11	-0.10	0.55
Robust Standard Errors	2.16	3.63	1.58
95% Confidence Intervals	-3.1 to 5.3	-7.2 to 7.0	-2.6 to 3.6

In a regression discontinuity framework, the estimates are not only sensitive to the size of the bandwidth, but also to the degree of the polynomial used to approximate the population conditional mean functions for the control and treated groups. Gelman and Imbens (2014) provide evidence that controlling for high-degree polynomials in regression discontinuity analysis usually leads to noisy estimates with weak statistical properties and overoptimistic confidence intervals (see Calonico, Cattaneo and Titiunik, 2015, and their `'rdrobust' R` package).

Figure 3.5 is generated using the `lfitci`-command in Stata. It shows turnout rates for 30 federal referendums/initiatives, around the introduction of postal voting, plotted against the mid-point of the bins. The solid lines are the fitted values lines for regressions of turnout on the assignment variable just before and after the introduction of postal voting. In addition, and more importantly, Figure 3.5 plots five referendum/initiative day bin averages, in order to evaluate whether there is any jump at the threshold for treatment. The five referendum/initiative days fitted regression lines also operate as placebo tests and aim to assess if there is any particularity in the jump at the cutoff. The graph below (see Figure 3.5) shows that the jump at the cutoff point where the treatment begins is positive but not significant. Furthermore, the jump in the outcome variable at the cutoff point is not unusually large compared to the "bumps" in the fitted regression lines away from the cutoff. There is another

jump in the pre-treatment period which exceeds the one at the cutoff. Overall, Figure 3.5 displays a slightly increasing trend of turnout over the corresponding time points, but no significant jump at the threshold for treatment. The increasing turnout trend starts long before the postal voting was implemented. Altogether, there seem to be no significant differences between average turnout rates on both sides of the cutoff point.

As indicated in section 3.4, a series of regression discontinuity analyses are conducted using various smoothers. As can been seen from Figure 3.8 and Table 3.9 - 3.14 in the Appendix, in none of the cases was found a significant effect of postal voting on voter turnout.[13] The size of the effect remains constantly below 1.2 percentage points. In summary, both identification methods, SCM and RDD, are concordant in that there seem to be no clear positive impact of postal voting on turnout.

[13]Figure 3.8 and Tables 3.9 - 3.14 are constructed using the `rdplot` and `rdrobust` package for Stata (see Calonico, Cattaneo and Titiunik, 2015).

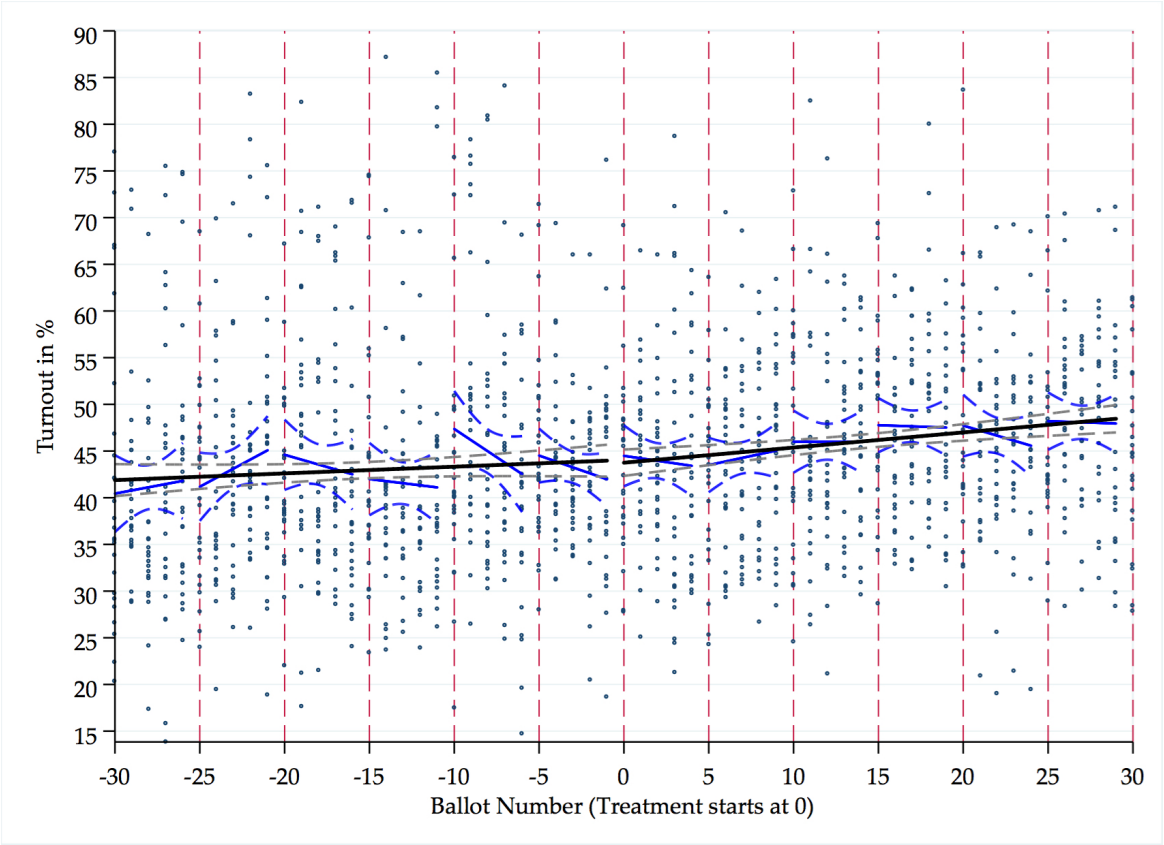

Figure 3.5: Estimated Effects of Postal Voting on Turnout: Local Regression Smoother

3.5.3 Additional Analysis using Linear Fixed Effects Regression Estimators

As mentioned above, the estimates from Luechinger, Rosinger and Stutzer (2007) are in all likelihood biased due to their implicit assumption in the analysis that unobserved confounders remain constant across cantons and over time. This is a problematic assumption given the long time span they consider (i.e., 35 years).

In order to test whether the findings from Luechinger, Rosinger and Stutzer (2007) hold true also for shorter time periods, I conduct a fixed-effects regression with four cantons that have introduced postal voting at the same time, namely Basel Stadt, Geneva, Graubunden, and Uri. The time period considered in this analysis spans from June 1988 to June 1999. During this period were held 33 referendums/initiatives; 20 before the introduction of postal voting in the selected cantons and 13 afterwards. As control variables, the model uses the cantonal unemployment rate in %, the populations size, the share of old and young citizens, a linear and quadratic trend, and time and spatial fixed effects.[14] The results from the fixed effects regression with robust standard errors are shown in Table 3.4. Although statistically not significant (p-Value = 0.138), the estimate for postal voting is unbiased: the coefficient shows a negative effect on turnout in the cantons of Basel Stadt, Geneva, Graubunden, and Uri. The direction of the effect is exactly opposite to the one in Luechinger, Rosinger and Stutzer (2007). Given the low number of the observations (N = 132) and — due to the time fixed effects — the large amount of the variables in model, this estimation is very demanding of the data. This is probably the reason why most of the estimates, including the coefficients for postal voting are not statistically significant.

For robustness checks, I conduct the same analysis with almost identical data as

[14]Luechinger, Rosinger and Stutzer (2007) use an almost identical model in their analysis.

Table 3.4: Fixed Effects Regression with Robust Standard Errors for Selected Cantons (Time Period: 1988-1999)

Dependent Variable: **Turnout in %**	*Estimates*	*SE*
Postal Voting *(1 = Yes, 0 = No)*	-4.836	2.407
Unemployment in %	0.970	0.562
Population Size (in thousands)	-0.034	0.080
Share of > 64 years old	18.766*	4.693
Share of < 20 years old	4.628**	0.728
Lineartrend	-6.065	4.054
Quadratic Trend	0.119	0.090
Intercept	-284.455	132.586
N × T	132	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: The time dummies have been suppressed. For complete results consult Table 3.15 in the Appendix.

in Luechinger, Rosinger and Stutzer (2007), but only for the above-mentioned four cantons.[15] The results can be found in Table 3.16 (see the Appendix). Also here, the effect of postal voting has a large negative impact (-9.546) on cantonal turnout rates. The effect is at 10%-level statistically significant (p-Value = 0.053). This finding is quite surprising, because it implies that in Luechinger, Rosinger and Stutzer (2007) the results — a positive effect of postal voting on turnout — may be driven by other cantons than the four analyzed here.

In a nutshell, also this part of this analysis fails to support the findings in the Luechinger, Rosinger and Stutzer (2007) study. In my opinion and as mentioned in subsection 3.5.1., there is no compelling reason why postal voting should have a positive effect on turnout in some cantons but no effect or even a negative effect in the others, such as Basel-Landschaft, Basel Stadt, Geneva, Graubunden, St. Gallen, and Uri. It is thus probable that the findings in Luechinger, Rosinger and Stutzer

[15]The time span in the Luechinger, Rosinger and Stutzer (2007) study goes from 1970 to 2005.

(2007) are an artefact due to the assumption of homogeneous treatment effect and that the unobserved confounders remain constant over such a long period of time (i.e., 35 years).

3.6 Conclusions

Since Oregon adopted an all-mail balloting system in 1998, there is an increasing number of studies examinating the effects of postal voting on voter turnout (Bergman and Yates, 2011; Funk, 2010; Kousser and Mullin, 2007; Gerber, Huber and Hill, 2013; Larocca and Klemanski, 2011; Richey, 2008; Gronke, Galanes-Rosenbaum and Miller, 2007; Berinsky, Burns and Traugott, 2001; Southwell and Burchett, 2000; Magleby, 1987; Gronke and Miller, 2012; Southwell, 2009; Karp and Banducci, 2000; Berinsky, Burns and Traugott, 2001). With wildly fluctuating estimates across studies, the existing evidence as to whether there is an effect of postal voting on turnout could not have been more inconclusive. Until now, however, an empirical gap remained, pertaining to the question of whether postal voting has had an impact on voter turnout in direct democratic votes (for a partial exception see Luechinger, Rosinger and Stutzer, 2007).

The objective of this study was to fill this empirical gap. Although it seems logical that reducing voting costs should lead to higher turnout, one could argue that the adoption of the postal voting system has not lowered these costs enough so that its impact would be reflected in overall higher voter participation. It can also be argued that maybe, while this electoral reform may attract new categories of citizens to participate, it has a negative impact on the civic aspects of voting, e.g., less social pressure to vote or loss of the ritual of going and cueing at the polling station (see Funk, 2010).

Using two alternative estimation techniques, this study comes to a clear conclusion that the adoption of the unrestricted postal voting system has not resulted in overall higher voter turnout at federal referendums/initiatives in Switzerland.

This and the study from Luechinger, Rosinger and Stutzer (2007), although based on almost exactly same data, come to opposite conclusions as to whether mail balloting has a positive effect on participation. The most important limitation in the work of Luechinger, Rosinger and Stutzer (2007) lies in the fact that their identification strategy makes unrealistic assumptions regarding the possible influence of time-variant unobserved omitted variables. As their paper analyzes the effect of postal voting over a time-span of 35 years, the assumption of no time-variant heterogeneity is simply unrealistic. The use of fixed-effects estimators on data spanning very long time-periods, will most definitely lead to biased estimators (Schmidt and Sickles, 1984). The current study offers a major advantage over the above-mentioned previous work, for its estimation techniques are based on much more credible assumptions.

Hence, as (Gronke, Galanes-Rosenbaum and Miller, 2007, p. 644) note, we should remain skeptical of those who advocate in favor of electoral reforms primarily based on expectations that this may lead to higher participation rates. The results of this study neutralize the thesis that easing voting procedures always leads to higher turnout. They also reveal that the expectations about the impact of postal voting on turnout were exaggerated. While many countries are considering implementing E-Voting systems (also known as online voting), we should not entertain exaggerated expectations as to whether such reforms will massively impact voter turnout. Perhaps such electoral reforms are simply necessary — an attempt to adopt to current trends.

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Appendix

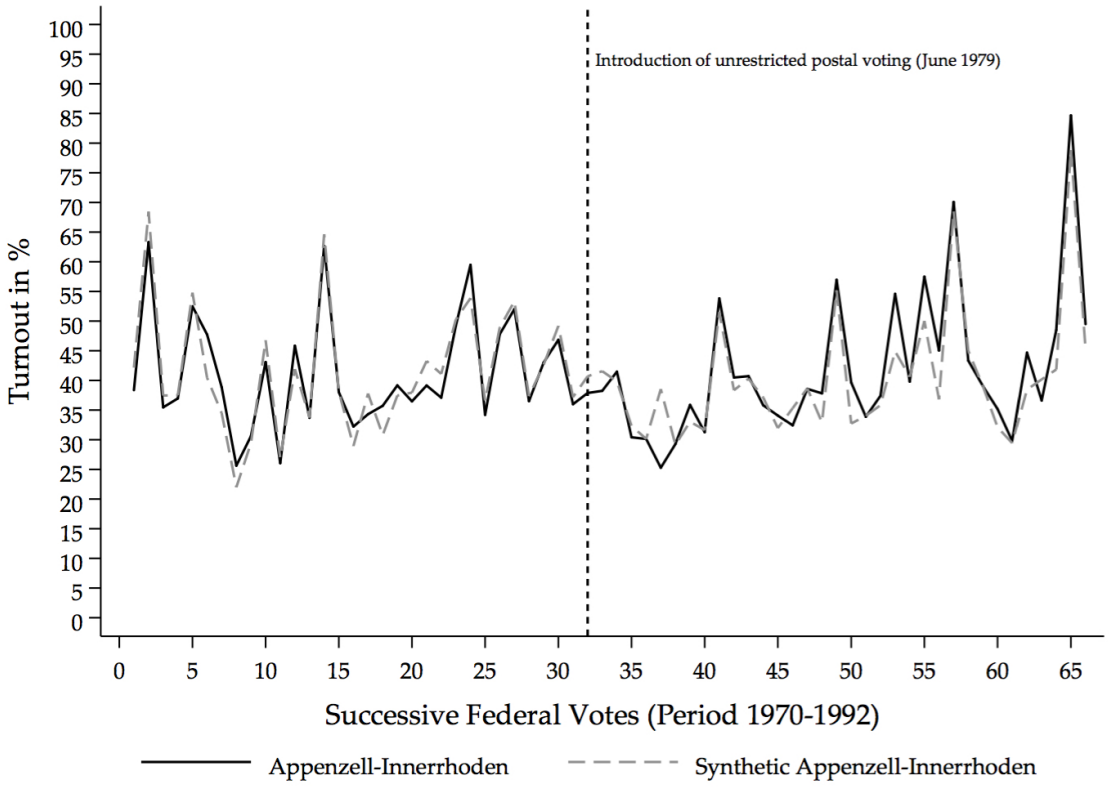

Figure 3.6: Turnout Trends: Appenzell-Innerrhoden vs. Synthetic Appenzell-Innerrhoden

Table 3.5: Unit Weights for Synthetic Control of Canton Basel-Landschaft

Control Units	*Unit Weight*
Aargau	0
Basel-Stadt	0.238
Freiburg	0
Genf	0.165
Glarus	0
Graubunden	0
Luzern	0
Neuchatel	0.136
Nidwalden	0
Obwalden	0.208
Schaffhausen	0.091
Schwyz	0
Tessin	0.153
Uri	0
Waadt	0
Wallis	0.009
Zug	0
Zurich	0
RMSPE	2.598

Table 3.6: Balance between Treatment and Control Group: Basel-Landschaft

	Pre-Treatment Period		Post-Treatment Period	
	Basel-Landschaft	Controls	Basel-Landschaft	Controls
Turnout	40.66	40.47	43.61	42.29
Unemployment	0.24	0.27	2.05	2.25
Population	208.78	183.62	245.55	265.72
Age >= 65	0.09	0.15	0.15	0.15
Age < 20	0.32	0.28	0.23	0.24

Table 3.7: Unit Weights for Synthetic Control of Canton St. Gallen

Control Units	*Unit Weight*
Aargau	0.182
Basel-Stadt	0.043
Freiburg	0
Genf	0.020
Glarus	0
Graubunden	0.438
Luzern	0
Neuchatel	0
Nidwalden	0.197
Obwalden	0
Schaffhausen	0
Schwyz	0.012
Tessin	0
Uri	0
Waadt	0
Wallis	0
Zug	0.016
Zurich	0.092
RMSPE	1.551

Table 3.8: Balance between Treatment and Control Group: St. Gallen

	Pre-Treatment Period		Post-Treatment Period	
	Basel-Landschaft	Controls	Basel-Landschaft	Controls
Turnout	44.67	44.82	40.40	39.93
Unemployment	0.126	0.118	1.89	2.31
Population	384.43	274.75	434.60	266.68
Age >= 65	0.13	0.12	0.14	0.15
Age < 20	0.34	0.32	0.26	0.24

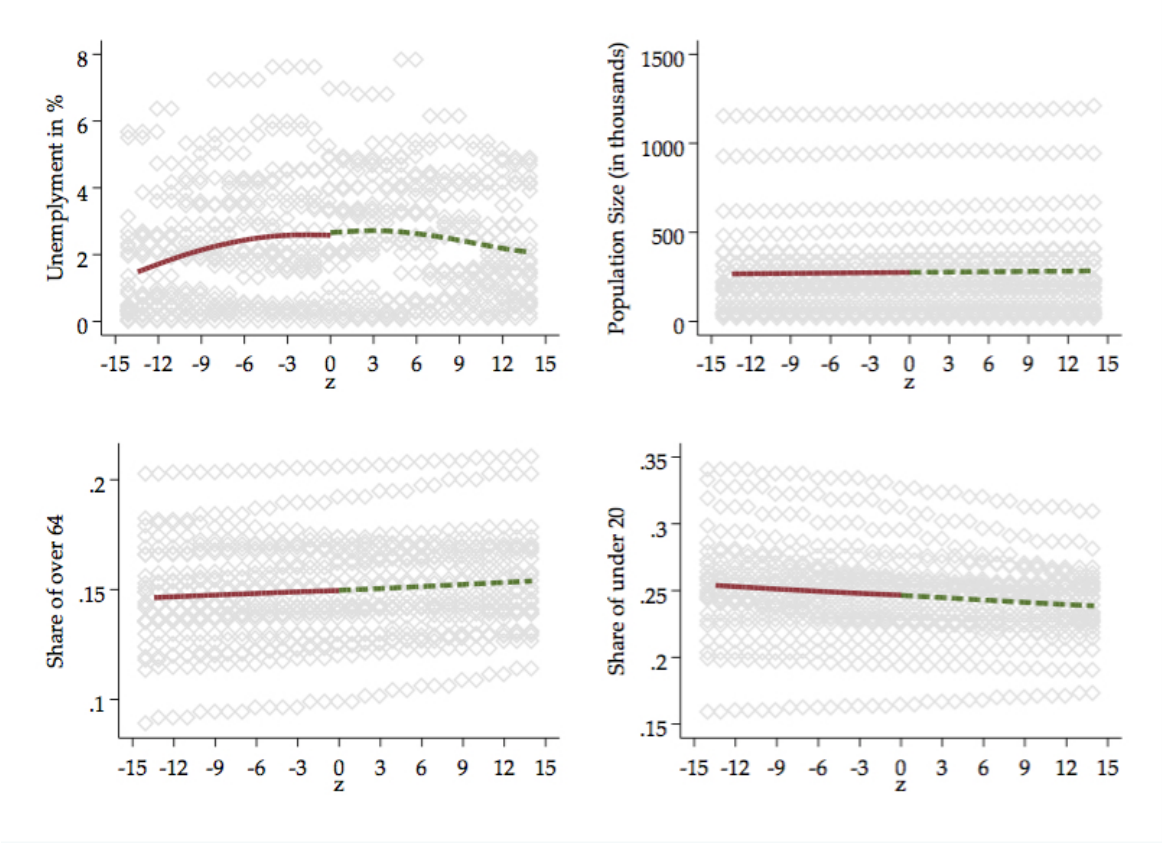

Figure 3.7: Smoothness of the Covariates at the Threshold for Treatment

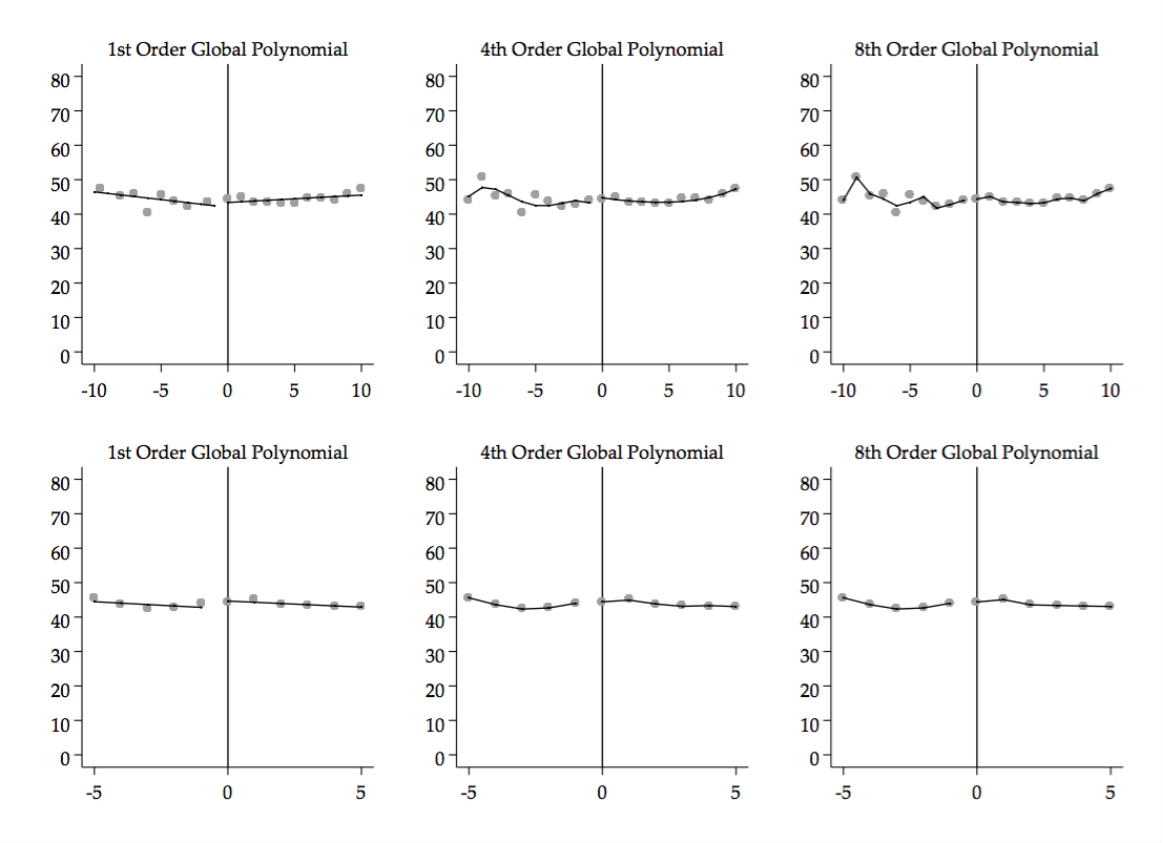

Figure 3.8: High and Low Order Local-Polynomial Regression-Discontinuity Point Estimators

Table 3.9: 1st-Order Local-Polynomial (Bandwidth: IK, 10 Referendum/Initiative Days)

Turnout in %	*Estimates*	*SE*
Conventional	1.160	2.513
Bias-corrected	-3.037	2.513
Robust	-3.037	5.484
N	525	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 3.10: 4th-Order Local-Polynomial (Bandwidth: IK, 10 Referendum/Initiative Days)

Turnout in %	*Estimates*	*SE*
Conventional	-8.467	10.423
Bias-corrected	-6.309	10.423
Robust	-6.309	19.510
N	525	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 3.11: 8th-Order Local-Polynomial (Bandwidth: IK, 10 Referendum/Initiative Days)

Turnout in %	*Estimates*	*SE*
Conventional	-0.492	4.893
Bias-corrected	-0.005	4.893
Robust	-0.005	5.278
N	525	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 3.12: 1st-Order Local-Polynomial (Bandwidth: IK, 10 Referendum/Initiative Days)

Turnout in %	*Estimates*	*SE*
Conventional	-0.227	3.772
Bias-corrected	-2.033	3.772
Robust	-2.033	5.230
N	275	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 3.13: 4th-Order Local-Polynomial (Bandwidth: IK, 10 Referendum/Initiative Days)

Turnout in %	*Estimates*	*SE*
Conventional	-0.155	25.752
Bias-corrected	-1.832	25.752
Robust	-1.832	37.244
N	275	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 3.14: 8th-Order Local-Polynomial (Bandwidth: IK, 10 Referendum/Initiative Days)

Turnout in %	*Estimates*	*SE*
Conventional	0.170	3.166
Bias-corrected	0.244	3.166
Robust	0.244	3.049
N	275	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 3.15: Fixed Effects Regression with Robust Standard Errors for Selected Cantons (Time Period: 1988-1999)

Dependent Variable: **Turnout in %**	*Estimates*	*SE*
Postal Voting *(1 = Yes, 0 = No)*	-4.836	2.407
Unemployment in %	0.970	0.562
Population Size (in thousands)	-0.034	0.080
Share of $>$ 64 years old	18.766*	4.693
Share of $<$ 20 years old	4.628**	0.728
Linear Trend	-6.065	4.054
Quadratic Trend	0.119	0.090
Ballot ID=55 (12.06.1988)	.	.
Ballot ID=56	9.082**	0.965
Ballot ID=57	-4.797	2.134
Ballot ID=58	26.801**	2.172
Ballot ID=59	0.654	4.073
Ballot ID=60	2.687	2.240
Ballot ID=61	-6.466	3.067
Ballot ID=62	-6.682*	1.841
Ballot ID=63	3.115	3.610
Ballot ID=64	-1.768	5.066
Ballot ID=65	4.039	4.291
Ballot ID=66	35.718**	4.913
Ballot ID=67	3.380	2.280
Ballot ID=68	11.303*	2.160
Ballot ID=69	-6.908	2.891
Ballot ID=70	-0.404	3.173
Ballot ID=71	0.611	9.222
Ballot ID=72	-0.334	3.418
Ballot ID=73	0.718	3.745
Ballot ID=74	.	.
Ballot ID=75	-5.578	4.359
Ballot ID=76	.	.
Ballot ID=77	-5.598	4.759
Ballot ID=78	-4.703	5.837
Ballot ID=79	3.771	2.013
Ballot ID=80	-9.255**	1.413
Ballot ID=81	-4.636	2.605
Ballot ID=82	-1.863	3.445
Ballot ID=83	6.193	3.083
Ballot ID=84	-5.570*	1.502
Ballot ID=85	-9.386*	2.337

Ballot ID=86	-12.601*	3.437
Ballot ID=87 (13.06.1999)	.	.
Intercept	-284.455	132.586
N × T	132	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 3.16: Fixed Effects Regression with Robust Standard Errors for Selected Cantons (Time Period: 1970-2005)

Dependent Variable: **Turnout in %**	*Estimates*	*SE*
Postal Voting *(1 = Yes, 0 = No)*	-9.546	3.068
Unemployment in %	1.083	0.600
Population Size (in thousands)	-0.021	0.018
Share of > 64 years old	0.609	1.085
Share of < 20 years old	2.283*	0.539
Linear Trend	0.828	0.433
Quadratic Trend	0.004	0.008
Ballot ID=1 (01.02.1970)	0.000	.
Ballot ID=2	38.433*	9.273
Ballot ID=3	9.077	6.632
Ballot ID=4	1.161	3.435
Ballot ID=5	24.717*	7.128
Ballot ID=6	1.508	3.894
Ballot ID=7	3.779	7.239
Ballot ID=8	-6.195	7.504
Ballot ID=9	0.061	7.687
Ballot ID=10	17.530	9.459
Ballot ID=11	-9.894	3.436
Ballot ID=12	6.952	3.819
Ballot ID=13	2.264	4.592
Ballot ID=14	36.256*	10.416
Ballot ID=15	4.928	4.798
Ballot ID=16	-4.404	3.636
Ballot ID=17	4.651	3.553
Ballot ID=18	-6.946	2.885
Ballot ID=19	5.006	4.802
Ballot ID=20	-1.921	2.210
Ballot ID=21	3.400	6.135

Ballot ID=22	8.868	5.809
Ballot ID=23	9.084	5.375
Ballot ID=24	13.648	4.890
Ballot ID=25	14.927*	3.628
Ballot ID=26	3.323	4.430
Ballot ID=27	11.210	4.689
Ballot ID=28	11.615*	2.379
Ballot ID=29	4.232	4.784
Ballot ID=30	8.212	3.646
Ballot ID=31	13.976*	2.953
Ballot ID=32	3.749	3.473
Ballot ID=33	0.927	3.582
Ballot ID=34	4.832	3.556
Ballot ID=35	8.075	5.156
Ballot ID=36	0.410	5.403
Ballot ID=37	-5.346	2.531
Ballot ID=38	-1.825	4.094
Ballot ID=39	-3.744*	0.655
Ballot ID=40	-4.891**	0.628
Ballot ID=41	-1.398	5.269
Ballot ID=42	13.729**	2.330
Ballot ID=43	5.529	5.225
Ballot ID=44	6.113	3.199
Ballot ID=45	-0.422	2.932
Ballot ID=46	-1.333	4.844
Ballot ID=47	-3.648*	0.955
Ballot ID=48	0.843	1.823
Ballot ID=49	2.765	1.983
Ballot ID=50	11.927*	2.815
Ballot ID=51	-6.042**	0.855
Ballot ID=52	0.855	2.266
Ballot ID=53	6.630	3.356
Ballot ID=54	7.646*	1.840
Ballot ID=55	4.037	3.360
Ballot ID=56	13.119*	4.044
Ballot ID=57	-2.363	3.037
Ballot ID=58	29.235**	2.488
Ballot ID=59	1.695	2.585
Ballot ID=60	3.728	2.231
Ballot ID=61	-5.926**	0.833
Ballot ID=62	-6.142	3.188
Ballot ID=63	3.340	2.621

Ballot ID=64	-1.543	3.020
Ballot ID=65	4.264	3.134
Ballot ID=66	35.943**	4.150
Ballot ID=67	3.470	2.071
Ballot ID=68	11.393*	2.378
Ballot ID=69	-6.818**	0.958
Ballot ID=70	-0.314	2.298
Ballot ID=71	0.944	7.419
Ballot ID=72	0.000	.
Ballot ID=73	1.052	1.316
Ballot ID=74	0.334	3.379
Ballot ID=75	0.000	.
Ballot ID=76	5.578	4.308
Ballot ID=77	0.685	3.251
Ballot ID=78	1.580	9.603
Ballot ID=79	10.054*	2.544
Ballot ID=80	-2.073	3.604
Ballot ID=81	2.547	5.709
Ballot ID=82	6.625	5.736
Ballot ID=83	14.680**	1.768
Ballot ID=84	2.918	2.030
Ballot ID=85	0.604	2.977
Ballot ID=86	-2.611	2.375
Ballot ID=87	9.990*	2.583
Ballot ID=88	9.326	3.377
Ballot ID=89	14.499*	3.368
Ballot ID=90	7.999	3.158
Ballot ID=91	5.130	3.566
Ballot ID=92	18.196**	2.202
Ballot ID=93	6.518*	1.671
Ballot ID=94	2.038	1.240
Ballot ID=95	20.646***	1.080
Ballot ID=96	3.721	2.910
Ballot ID=97	6.358	2.168
Ballot ID=98	6.582*	1.910
Ballot ID=99	-7.966	3.588
Ballot ID=100	8.147*	1.528
Ballot ID=101	8.521	4.714
Ballot ID=102	10.191**	1.521
Ballot ID=103	11.236**	0.908
Ballot ID=104	-4.067	1.908
Ballot ID=105	14.306***	0.990

Ballot ID=106	11.833**	1.406
Ballot ID=107 (27.11.2005)	0.000	.
Intercept	-39.852	35.006
N × T	428	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

4

The Path to Becoming a Habitual Voter or Abstainer: A Latent Growth Curve Modeling Approach

Kushtrim Veseli

The question whether turnout is habitual has received considerable attention in the literature on electoral participation but much less so when it comes to direct democratic participation. The habituation thesis is based on the idea that behaviors become routine once they have been performed a number of times. The majority of existing studies, however, appears to be over-ambitious in the interpretation of their findings. Typically, these studies consider very few time periods, deemed too short to reliably determine persistence, let alone habituation. Using unique voter registration data from the Swiss canton of Geneva, I take a deep look into the dynamic patterns of change and continuity in individual level participation. The data consist of the actual turnout behavior of the entire population over 46 different votes taken at different time points. The main purpose of this study is to explore whether direct participation becomes a habit and, if so, how fast. Another major concern of this study is to examine whether habit-formation operates in the same way among typical voters and abstainers. I analyze the data using the technique of latent growth curve modeling, allowing for investigating systematic change and accordingly growth, and inter-individual variability in the change of propensity to vote. The results show that there is indeed an element of inertia in turnout that is probably due to habit-forming effects of voting behavior. However, habit-formation seems to operate differently among typical voters and nonvoters.

4.1 Introduction

It is commonplace for political scientists to argue that participation is the key to democracy. There is consequently no shortage of studies of participation trends and determinants of turnout. In these studies, there is increasing awareness that turnout decisions are not made anew in each election, as the proponents of rational choice theory would make us believe, but that turnout has the quality of being a habit. The idea of habitual voting is mainly based on the assumption that having made the same turnout decision during the first few voting occasions after reaching voting age, future participation will be automatic, all else being equal. Once the habit is formed, the inclination to belong to the same group — the habitual voters or the habitual abstainers — is expected to persist over time. Thus, turnout decisions made early in life are crucial for future participation behavior (see Denny and Doyle, 2009; Fowler, 2006; Green and Shachar, 2000; Gerber, Green and Shachar, 2003; Plutzer, 2002; Verba and Nie, 1972).

Although, the notion that turnout is habitual is quickly becoming conventional wisdom in voting behavior research, there are still clear gaps in the empirical foundations for this claim. The majority of existing studies appear to be over-ambitious in the interpretation of findings, as many claim habituation, but few actually demonstrate it. To my knowledge, there are only few papers presenting some evidence that the turnout decision can become a habit (see Denny and Doyle, 2009; Gerber, Green and Shachar, 2003; Green and Shachar, 2000; Plutzer, 2002). These studies have considerable strengths but also some significant weaknesses, in my opinion. At least two aspects of the literature on habitual voting behavior are deemed as problematic.

First, the existing studies refer mainly to electoral democracies.[1] As such, they

[1]For a partial exception see Serdült (2013).

consider a very low number of time points, usually not more than three elections. Psychological studies, however, suggest that one must repeat a behavior more than that in order for it to become a habit (e.g., Lally et al., 2010). Because in electoral democracies elections take place on average only every two years, it is hard to imagine, that a repetition of a certain behavior two or three times over a time span of several years, will lead to any habit formation.

Second, the majority of the exiting literature takes a "symmetrical approach" toward understanding habits in turnout behavior. By doing so, they assume that habit-formation operates in the same way among typical abstainers as well as voters. This implies that both groups — those who voted, and those who abstained, during the first few initial voting occasions after reaching voting age — develop participation and non-participation habits at the same pace. In other words, once a certain behavior has been repeated a number of times in the past, one should observe similar variability in future turnout for both groups.

Unfortunately, to date hardly any concept or theory has been developed to explain how fast habits of participation or abstention are formed. An exception is here Plutzer's (2002) paper, which finds that it takes a time span of three elections in order for citizens to make a transition from being a habitual nonvoter to a habitual voter. To the best of my knowledge, there are no studies that illustrate which group, the habitual voters or the habitual nonvoters, show higher variability in turnout over time. I consider this to be a crucial gap in the existing literature, as the assumption of symmetry regarding transition from voting to nonvoting and vice versa, despite being somewhat contra-logical, has never been put into a test.

Psychological literature, on the one hand, delivers strong evidence that some habits are easier to acquire than others (Lally et al., 2010). Simple behaviors may achieve higher levels of habituation, while complex ones either take a very long time, or

may even never become habitual (Lally et al., 2010; Verplanken, 2006). On the other hand, the act of voting itself requires always at least a minimal investment of time and resources. Accordingly, one can argue that habits are formed easier among nonvoters, because continuing the pattern of abstaining does not require any resources at all. From this perspective, a transition from voting to nonvoting seems more logical to occur among habitual voters, than the other way around (see Franklin, 2004, p. 204).

The primary concern of this paper is thus to shed light upon the question whether or not there is evidence that turnout decisions become a habit, and if so, how fast? Another main purpose of this study is to examine and better understand whether habit-formation operates in the same way among typical voters and abstainers.

This study draws on a rich data set from the Swiss canton of Geneva. The data present a number of important advantages compared to previous studies. First, it uses official data about a citizen's actual participation in referendums, initiatives, and elections, as opposed to self-reported turnout. The disadvantages of self-reported turnout, especially when it has not been validated, are well known but hard to avoid if there is no official record of participation (e.g., Selb and Munzert, 2013). Second, the data used in this study comprises the entire population of eligible voters in the canton. This leaves a large number of cases of individuals at age 18, the first time they have an opportunity to vote. This will be the subset of cases the study focuses on. Finally, the data covers 46 time points where participation was measured. These are excellent prerequisites to explore habituation over a long stretch of votes, more than any other study has managed to do so far.

The paper is organized as follows: Section 4.2 briefly discusses the theoretical expectations of the relationship between habituation and turnout. Section 4.3 discusses the challenges of offering empirical evidence for habituation. Section 4.4 describes the data and methodological approach. The results are presented in section 4.5, and

conclusions are presented in section 4.6.

4.2 Habituation in the Context of the Participation Behavior

Explaining turnout behavior is a central project in many areas of political science literature. As such, it has given rise to a voluminous literature along with various models, which try to describe the mechanisms behind citizens' turnout decision. Referring to Franklin (2004) these models can be sorted out crudely into three main schools of thought. An early school of thought, with advocates such as Merriam and Gosnell (1924), Gosnell (1927), Boechel (1928) and Tingsten (1937), assumes that turnout decisions are not a function of individuals' demographic characteristics, but rather of the character of the elections itself. Hence, abstention should be blamed on the character of the election, rather than on the character of the citizen who abstains (see Franklin, 2004, p. 2). A second school of thought, where also the rational choice theory has its roots, sees decision to participate or abstain as a function of voting costs, arguing that the benefits of voting are usually outweighed by its costs (Downs, 1957; Riker and Ordeshook, 1968). Finally, a third school of thought on voting behavior, current today, starts with the work of Verba and Nie (1972), where voting behavior is considered to be a habit, formed during early socialization years and heavily influenced by individual resources, such as socioeconomic status (see also Brody and Sniderman, 1977).

Since the 2000s a new substantial literature on voting behavior is on the rise. Its proponents are in line with Verba and Nie's (1972) arguments that participation behavior may be habit-forming (e.g., Denny and Doyle, 2009; Gerber, Green and Shachar, 2003; Green and Shachar, 2000; Plutzer, 2002). It is necessary here, however, to clarify that there is a degree of uncertainty around the concept of habituation in the existing vot-

ing behavior literature. As Dinas (2012, p. 432) points out, "*depending on the author, repeated participation behavior, apart from 'habit'* (Aldrich, Montgomery and Wood, 2011; Cutts, Fieldhouse and John, 2009; Czesnik, Zerkowska-Balas and Kotnarowski, 2013; Franklin, 2004; Gerber, Green and Shachar, 2003; Miller and Shanks, 1996), *has also been referred to as 'persistence'* (Denny and Doyle, 2009; Meredith, 2009; Sears and Levy, 2003), *'inertia'* (Plutzer, 2002), ..., *or 'consuetude'* (Green and Shachar, 2000)." To avoid confusion with the terminology in the existing studies, the current study labels repeated participation behavior also as habit, whereby a typical habitual voter or an abstainer is defined as someone who makes turnout decisions in the absence of weighting the pros and the cons of participation.

The ideas in habitual voting literature run counter to the fundaments of rational choice theory (Fiorina, 1990; Fowler, 2006). If voting behavior is in fact habitual, then this sets clear limits on when established predictive constructs such as political attitudes, internal and external efficacy, socio-economic class, rationality, choice, uncertainty, information, and so forth, can predict future participation behavior (Neal, Wood and Quinn, 2006; Plutzer, 2002).

Existing psychological literature defines vaguely that responses become routine or habitual through behavioral repetition. Hence, response repetition and time are of an essential importance for a habit to occur. How long it takes to develop a new habit varies widely depending on the behavior, the person, and the circumstances. Psychological studies have come up so far with different suggestions, as to when exactly does a response become a habit. In their study Lally et al. (2010) find out that some habits are easier to acquire, and others harder. Generally, complex behaviors tend to achieve lower levels of habituation than simple behaviors (Lally et al., 2010; Verplanken, 2006; Wood, Quinn and Kashy, 2002).

The habitual voting thesis is based on the assumption that initial turnout makes

subsequent turnout more probable, all else held constant. It implies that turnout decision becomes an automated response, acquired incrementally during the first few voting occasions after reaching eligibility age. In other terms, initial turnout decisions made by those eligible to vote for the first time set the course for a behavioral reinforcement process that strengthens the likelihood of belonging to the same group, i.e., voters or nonvoters, also in the future (e.g., Fowler, 2006; Green and Shachar, 2000; Gerber, Green and Shachar, 2003; Plutzer, 2002). According to this thesis, habit automaticity in voting behavior establishes when a person exhibits similar participation pattern over time without consciously selecting it over the other alternatives. Neal, Wood and Quinn (2006) describe habits as automated responses cued by aspects of the performance context, such as environment or preceding actions. As Aldrich, Montgomery and Wood (2011, p. 541) point out, *"people learn context–response associations and these are then available in memory to guide subsequent responses"*. The habit theory defines "context" as a cue or an event that triggers the habit performance (Aldrich, Montgomery and Wood, 2011, p. 542). Stepping into a car, for instance, triggers the habit of wearing the seat belt. Some individuals are in the habit of wearing it, but some are not. People do not go through a detailed decision making process each time they step into a car, whether to wear the seat belt or not. Quite the contrary, they tend to yield to their already formed habit more or less reflexively (see Aldrich, Montgomery and Wood, 2011, p. 536). In the context of participation, a cue may be interpreted as something reminding a person that voting day is here. It can be the news, a debate, street posters, and other events associated with the voting occasion. In Switzerland, as a cue can be considered, among other things, the booklet containing political information about each issue, which every eligible voter receives about four weeks prior to the voting occasion.

At first, naturally every person starts with no strength of participation habit (see

Plutzer, 2002). Only by repeating the same participation behavior pattern over time, one reaches a point when turnout decisions become habitual (Aldrich, Montgomery and Wood, 2011). If they become habitual, then the investment in time and resources is minimal in order to continue the same pattern. For recently eligible voters, however, this investment may be more substantial, because they first have to become familiar with the political and electoral system as a whole (see also Hooghe, 2004, p. 335).

Once a certain voting behavior has been repeated a number of times and a habit is formed, the predictive power of "traditional" turnout determinants should diminish. Existing studies suggest that reliable turnout predictors, such as measurements of life achievements, mobilization forces, social pressure, electoral context, or competitiveness of the election, seem to lose their power as the person ages (Dinas, 2012; Franklin, 2004; Plutzer, 2002). This phenomenon is in one accord with the habituation thesis. For instance, if a person's first vote occurred at the time of a high salient initiative, referendum, or election, this should help to set her or him on a path of active participation in the future. Hence, reliable turnout determinants, such as salience of the vote, should matter the most for recently eligible voters. As time passes by, the predictive power of those determinants should decrease, while citizen's voting history becomes an ever more powerful predictor of future behavior, thus absorbing the predictive power of the salience.

4.3 Challenges of Offering Empirical Evidence for Habituation Outside an Experimental Environment

Apart from tracking and then utilizing the differences of each individual's voting history since eligibility age, this study excavates traces of habitation in voting behavior by looking at the attributes of voting occasions and whether they continue to be

influential over time.

The most difficult part of uncovering habituation is its automaticity. Of course, the best evidence here would be implicit or neurological measures, which are available neither in the current nor in other existing studies. One way to manage this problem is to offer indirect evidence concerning one key aspect of habituation: the absence of weighting the pros and the cons of participation. The current study approaches this by investigating the impact of voting occasions characteristics on turnout over time. One measure stands out as particularly adequate for capturing the attributes of voting occasions, i.e., the salience of the votes at hand.

As it is well known, the salience of the issues in a voting occasion is a well-recognized determinant of participation. Turnout rates fluctuate across voting occasions depending on the salience of the issues at hand. Campbell (1960) was one of the first to introduce the distinction between high and low stimulus elections. He found out that presidential elections in the U.S. are high stimulus elections, because the campaigns and mobilization efforts are more dynamic thus inducing a surge of political information about the issues (Campbell, 1960). However, this is not the case with midterm elections. Accordingly, the basic idea of Campbell's "Surge and Decline Theory" is that presidential and midterm elections differ in the amount of stimulaion offered to the public (Campbell, 1960). Therefore, differences in turnout levels across elections are mainly caused by fluctuations in the salience of the issues at hand (Campbell, 1960, p. 399).

In Switzerland, or more concretely in the canton of Geneva, the differences in turnout levels from one voting occasion to another have been traditionally large (see Figure 4.8 in the Appendix). This has primarily to do with the fact that the issues in referendums and initiatives vary from being crucial for the economy or cohesion of the society to being very esoteric and relevant only to few stakeholders. Crucial is-

sues tend to generate an avalanche of political information and mobilization attempts from all sides thus motivating more citizens to participate. The converse is also true; esoteric issues are not politicized much before voting, thus leading to fewer citizens participating.

In this study, the salience of voting is what Campbell (1966, p. 42) identifies as *"the level of political stimulation to which the electorate is subjected"*. To the best of my knowledge and with regard to the current study's data, the only available proxy that is appropriate for measuring the salience of political contests is the average turnout level in the respective ballot days. I am aware that using the average turnout as proxy for the salience of an issue is somewhat endogenic and that maybe a better way would be to utilize the topics of each issue at hand. However, separating the level of public stimulation caused by each issue is not an option. On a particular ballot day, there may be multiple initiatives and/or referendums, but the cantonal data do not identify in which of these the voter participated. Data exist for whether or not the voter participated in at least one of these votes only. As a consequence, there are ballot days in which various issues are voted on; disentangling the amount of political stimulation to which the electorate is subjected due to each issue is, at least with the available data, not feasible.

Does this study's measure of salience, hence, adequately capture the distinction between high and low stimulus voting occasions? I am confident that it does. Usually, high salience issues are reflected by high levels of turnout. On the one hand, in Switzerland like elsewhere, it is easily observable that citizens respond to crucial or highly politicized issues with higher participation. On the other hand, there is no compelling reason to believe that also low stimulus issues would generate a surge in turnout. For instance, the so-called "minaret initiative" in November 2009 or the "immigration initiative" in February 2014 were highly controversial initiatives

followed by a broad media coverage and mobilization efforts from all stakeholders. As a consequence, the participation rates in those voting occasions were well above the Swiss average, namely 54 % and 57 %. Hence, to my opinion, the average turnout of voting occasions is an adequate proxy for the level of stimulation to which eligible voters were subjected at the respective occasion.

So, how does salience of the vote help to capture habituation effects in voting behavior? If salience of the voting occasion maintains the same level of influence on turnout over time, this would imply that citizens' responsiveness toward this attribute is also constant, hence denying the case for habituation which prognosticates that turnout decisions become unconscious once a habit of voting or abstaining is formed. In other words, a habitual voter or abstainer is expected to be non-responsive to exogenous shocks such as salience of the vote, as his/her decision to turnout is automatic and thus unrelated to the outside world.

Evidence for the habituation thesis would be the case, where a voting occasion attribute such as salience, which at the same time is an important predictor of turnout, would matter the most for recently eligible voters. But as time passes, the predictive power of salience should decrease and eventually become irrelevant, while citizens' voting history absorbs its predictive power. Hence, a lessening predictive power of the salience would indicate that turnout decisions are not being made anew at each voting occasion, which again would indirectly imply traces of habituation in voting behavior or, in other words, that turnout decisions have become automatic.

4.4 Methodology

4.4.1 Data

With referendums and initiatives being an inseparable part of the political landscape, Switzerland is a unique case, as it offers large amount of voting behavior data over a relatively long period of time. Since 1996, the canton of Geneva systematically collects data on the political participation of its citizens. Generally, in Switzerland citizens are called to vote on average 4 times every year. These democratic votes, such as initiatives and referendums, but also elections for political office take place at three administrative levels, namely at federal, cantonal, and communal level.

The data used in this paper consist of actual turnout behavior of the entire population of Geneva over 46 different direct democratic votes and elections taken at different time points between 1996 and 2005. For each voting occasion, the canton recorded whether a citizen participated or not. An anonymous and unique identification number, generated for each citizen, allows to track each individual's turnout behavior over time and across ballots. The data also includes demographic information, such as age, gender, marital status, and whether the person is a native of the canton of Geneva. Furthermore, the data includes variables that measure characteristics of the votes, specifically, the administrative level, at which the vote took place; whether it was a direct democratic vote or an election; and the official turnout rate of the voting day, which is then conceived as an indicator of the salience of the voting occasion.

For each voting occasion, there are roughly 200'000 observations, which is the size of the electorate in the canton of Geneva. In order to minimize the problem of initial conditions, arising due to discrepancies between the start of the observation period and the stochastic process generating citizens' voting experience (see Arulampalam, Booth and Taylor, 2000, p. 26; Heckman, 1981), the analysis includes only citizens

that were born in or after 1978. This leaves the data with over 27'778 individuals and 629'389 person-votes. The oldest individual in the dataset is 27, while the youngest is 18 years old. Basic descriptive statistics of the data can be found in Table 4.1. The Geneva data is time-unstructured, because the first measurement occasion is not identical across individuals. The data is also unbalanced, because the number of time points for which data exists varies across individuals. However, neither issue is a problem, as this paper uses a multilevel modeling setup, and whose properties can deal properly with unbalanced data structures.

Table 4.1: Descriptive Statistics

	Direct Democratic Votes		Elections		All Votes	
	Mean	SD	Mean	SD	Mean	SD
Turnout	0.38	0.48	0.26	0.44	0.34	0.48
Female	0.50	0.50	0.50	0.50	0.50	0.50
Native of Geneva	0.58	0.49	0.59	0.49	0.59	0.49
Single	0.97	0.17	0.97	0.19	0.97	0.17
Age	21.14	2.30	21.10	2.25	21.13	2.29
Salience	0.38	0.08	0.26	0.03	0.34	0.09
Federal Level	0.87	0.34	0.18	0.38	0.68	0.47
Cantonal Level	0.69	0.46	0.50	0.50	0.64	0.48
Communal Level	0.35	0.48	0.33	0.47	0.35	0.48
Popular Vote					0.73	0.44
Proximity (Closeness) of Vote	0.35	0.18				
N	27'655		27'487		27'778	
N × T	458'350		171'039		629'389	

Notes: Based on official election statistics from the canton of Geneva.

As it is well known, surveys usually yield rates of turnout that are higher than official figures (Holbrook and Krosnick, 2010). The data used in this study does not suffer the usual problems of systematic measurement error in self-reports, as the actual voting behavior of individuals is measured. This is a big advantage in comparison to

data used in a large part of the existing literature, because as Selb and Munzert (2013) point out, both the over-representation of voters and misreporting create major biases in survey-based examinations of turnout.

Another advantage of this study's data is that it provides for many voting occasions over a large period of time. This is essential when exploring habituation effects, for habits usually form only when an action is performed numerous times.

4.4.2 The Latent Growth Curve Modeling Approach

I analyze the data using the technique of latent growth curve modeling, which allows for investigating systematic change and accordingly growth, but also inter-individual variability in the change of propensity to vote.

The use of growth curves with a binary indicator is not omnipresent in the existing literature. Plutzer (2002) was one of the first to apply a latent growth curve model with a dummy dependent variable. A latent growth curve approach makes sense here because the model assumes that the underlying variable Y* is a continuous vote propensity. In general, the relationship between the dependent variable, y (Voted: 1 = Yes, 0 = No), and the latent propensity of voting, Y*, is given by:

$$Y_{it} = \begin{cases} 1 & \text{if} \quad Y_{it}^* > 0 \\ 0 & \text{if} \quad Y_{it}^* = 0 \end{cases}$$

The latent tendency of voting cannot be gauged directly, hence one must use observed behavior to get at Y* (see Masyn, Petras and Liu, 2014; Rabe-Hesketh and Skrondal, 2013).

To build the latent growth curve model, the analysis includes only individuals, who are first eligible to vote in occasion t and continue to be eligible to vote in subsequent

elections, $t+1, t+2, ..., t+(T-1)$. All the individuals, who had the right to vote before the start of the observation period, are excluded from the analysis. At each occasion the individuals are observed to vote or abstain and this is then conceived as an indicator of a latent propensity to vote. The analysis sections of this paper is structured in such a way that it utilizes the latent growth model on three different levels.

4.4.2.1 Initial Analysis

In a first step, this study engages in the selection of the best-fitting growth curve model. Let y_{ti} be 1 if individual i voted at time t, and 0 if she or he abstained. Underlying y, there exists a continuous Y*, which denotes the latent probability of turnout. The Y* is modeled as a function of time. Various time functions are conceivable, however, in this case, the linear and logarithmic models are the best fitting candidates. One might suggest that also the quadratic term of the time might be a good fitting function for the data. As mentioned in the data discussion section of this study, the oldest individual in the data set is 27 years old. The existing literature and various descriptive statistics of voting behavior report a tipping point in turnout only at age of 65 or higher. This group of individuals is observed to abstain more often from the polls, due to age induced immobility and other health issues. While the effect of time is expected to have diminishing marginal returns for all individuals, a tipping point in turnout behavior due to age in not expected for individuals of age 27 or less.

In its simplest case, a latent growth curve model is specified as:

$$Y_{it}^{*} = \beta_{0i} + \beta_{1i} O_{ti} + \varepsilon_{ti},$$

where O_{ti} is the measurement occasion. An occasion denotes a voting date, where the vote can be a referendum, an initiative or an election at any administrative level, such as federal, cantonal, or communal. As an alternative, one could specify a model with $ln(O_{ti})$. The O_{ti} variable is coded $1, 2, ..., T_{i-1}$, and T_i is the number of voting occasions observed for each individual. Each individual's first vote is coded as $O_{ti} = 0$. Furthermore, each individual has a different probability of voting in their first eligible voting occasion and each has a unique developmental trajectory in the subsequent ones. Hence, both the intercept and the slope are allowed to vary across units, subject to the following specification:

$$\beta_{0i} = \gamma_{00} + \delta_{0i}$$

$$\beta_{1i} = \gamma_{10} + \delta_{0i}$$

$$\begin{pmatrix} \delta_{0i} \\ \delta_{0i} \end{pmatrix} \sim \mathcal{MVN} \begin{pmatrix} 0 \\ 0 \end{pmatrix}, \begin{pmatrix} \tau_{00} & \tau_{10} \\ \tau_{01} & \tau_{11} \end{pmatrix}$$

The parameters β_{0i} and β_{1i} describe the latent growth curve for each individual. The intercept (β_{0i}) corresponds to the height or starting level of the curve, and denotes the underlying propensity to vote for each individual at the beginning of the observation period. The slope (β_{1i}) describes the steepness of increase or decrease in the probability to turnout.

In order to select the best-fitting growth curve model, several growth curve regimes will be specified. Their goodness of fit will be recorded in terms of both, the Bayesian information criterion (BIC) and the Akaike's information criterion (AIC). The selection of the most plausible model is done on the basis of BIC and AIC, respectively.

4.4.2.2 Bringing in Sequences

This part of the analysis section looks at the effect of voting sequences (citizen's voting history) on the propensity to turnout. Using the growth curve regime that was settled in the initial analysis, the time point of the analysis is shifted to different t-s in the future (e.g., $t = 3, t = 4, t = 7$, etc.). The underlying idea here is to find out, if at all, how long does it take for individuals with different voting history to become habitual voters or habitual abstainers, respectively.

Let us examine the case when the analysis is shifted to $t = 7$. In a next step, the vote sequence is ascertained for the previous time points. For example, 000011 denotes someone who abstained on the first four votes in which she or he could have participated and participated in the last two. All the observations for $t < 7$ are excluded from the analysis and what used to be $t = 7$, is now $t = 0$. Let S denote the sequence variable, which is a factor variable with $2^6 = 64$ possible sequences. The factor variable is coded as such that the sequence 000000 takes the value 1, 000001 takes the value 2, ..., and 111111 takes the value 64. The nominally scaled sequence variable is now added to the level-2 model. Using Stata notation, the intercept and the slope look as follows:

$$\beta_{0i} = \gamma_{00} + \gamma_{10} i.s_i + \delta_{0i}$$

$$\beta_{1i} = \gamma_{10} + \gamma_{11} i.s_i + \delta_{1i}$$

The mixed model is then:

$$y^*_{ti} = \gamma_{00} + \gamma_{10} i.s_i + \gamma_{10} O_{ti} + \gamma_{11} i.s_i \times O_{ti} + \delta_{0i} + \delta_{1i} \times O_{ti} + \varepsilon_{ti}$$

For the analyses of these models I use the Stata command `melogit`, which is suitable for multilevel mixed-effects models with binomial responses. As an approximating integration method for the calculation of the log likelihood, I use the mean-variance adaptive Gauss-Hermite quadrature. The number of integration (quadrature) points for all levels is set at 7. The variance and covariance structure of the random effects is distinctly estimated, where the within subject errors for each pair of time intervals have unique correlations (see Aho, 2013, p. 483). The only constraint on the variance-covariance matrix for the vector of random effects with two levels is that it is positive definite.

4.4.2.3 Adding Covariates

Having settled on a particular growth curve regime and charted the individual growth trajectories for individuals with different voting histories, the study now seeks to explore whether additional covariates can help to better understand the variation between different trajectories. The main focus shall be on three kinds of covariates: *a)* Explanatory variables x_{ti} that vary across individuals and over time, which are characteristics of the individual; *b)* Explanatory variables z_t that vary over time only, which are characteristics of the vote that is being conducted; and *c)* Explanatory variables w_i that vary across individuals only.

4.5 Results

4.5.1 Initial Models

In this first set of analyses I aim to find an adequate growth curve regime, which will be used in the subsequent models to explore whether there are habituation effects in participation behavior and if so how do they develop. The initial models, reported in Table 4.2, include only the time (successive voting occasions) and the salience of the vote, as explanatory variables. Thus, for all initial models the latent propensity to turnout (Y*) is a function of these two variables. Models A, B, and C are so-called random intercept models. Model A denotes the propensity to turnout as a function of linear time, whereas Model B includes additionally a squared version of time. Model C uses the logarithmic time as a predictor for the propensity to vote. Among these three models, Model C, the one with the logarithmic time, stands out as the best fitting model, as it scores the lowest AIC and BIC. According to Schwarz's weights, Model C is more likely to occur than both other models (see Table 4.2).

In the case of this study, the benefits of using the logarithmic version of time are twofold. First, the habituation thesis implies diminishing effects of time. At the beginning of the vote eligibility, time is expected to have a larger effect on habit-formation, whereas its influence should diminish as time passes by. One can account for these 'diminishing marginal returns' by including a logarithmic instead of a linear version of time into the model. Second, using logarithmic time increases the computational speed remarkably, as model calculations take an amount of time proportional to $k \times log(N \times T)$. This is a striking advantage compared to the models with linear or quadratic time. Given this study's length of the observation period (46 voting occasions), the number of person-votes, and the high complexity of the models, the logarithmic time approach saves many weeks of computational time. Hence, taking

into account the results from Table 4.2, the aforementioned arguments regarding 'diminishing returns of time', and the benefits from the increased computational speed, from now on, this study uses the growth curve regime settled in Model C.

The results in Table 4.2 show a negative effect of time on propensity to turnout. For one-unit increase in logarithmic time, the expected turnout change in log odds is -0.125. If this change in log odds is translated to a change in odds, one can expect to see an 11.75 % decrease in turnout odds.

The variable measuring the salience of the voting occasion is included into the model to account for the wild fluctuations in the turnout rates throughout the observation period and as explained in Section 3, it is also one of the main proxies for conscious thought.[2] Unsurprisingly, the effect of the salience on propensity to turnout is considerable. For one percentage point increase in the vote salience, the expected increase in turnout odds is 6.918 %.[3] This increase does not depend on the value that salience is held at. All the coefficients in the model are significant at the 0.1 % level.

For a better understanding of the results in Table 4.2, Figure 4.1 visualizes the effect of time on turnout at different levels of the vote salience, namely at the first quartile, at the mean, and at the third quartile. Although the negative effect of time is rather small, it still does strike as surprising, for time is expected to have a positive effect on the propensity to vote (Arzheimer, 2006; Bhatti and Hansen, 2012*a*; Blais et al., 2004). While people get older, they begin to put more emphasis on different aspects of civic virtues, such as, one's self image as a politically involved citizen, fulfilling her or his obligation to vote and not violating social norms, or even one's perceptions of equity or fairness (see Plutzer, 2002; Runciman, 1966).

Nevertheless, as Figure 4.2 illustrates, the citizens of Geneva of age 18 have a

[2]The turnout rate in the sample fluctuates between 15 and 64 % (see Figure 4.8 in the Appendix).
[3]$(e^{6.689/100} - 1) \times 100 = 6.918$.

Table 4.2: Base Models with Different Time Functions

Dependent Variable: **Voted** *(1 = Yes, 0 = No)*	*Model A*	*Model B*	*Model C*
Linear Time	-0.008***	-0.027***	
	(0.000)	(0.001)	
Salience of the Vote	6.731***	6.658***	6.689***
	(0.039)	(0.039)	(0.039)
Squared Time		0.001***	
		(0.000)	
Log(Time)			-0.125***
			(0.004)
Intercept	-3.216***	-3.094***	-3.028***
	(0.019)	(0.020)	(0.020)
Variance in the Intercept	3.240***	3.237***	3.242***
	(0.039)	(0.039)	(0.039)
AIC	617855.3	617473	617325.1
BIC	617900.7	617529.7	617370.5
Δ_i BIC	530.2	159.2	0
Schwarz's Weights	0	0	1
N × T	629'389	629'389	629'389

Standard errors in parentheses.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

higher turnout rate than their other peers in the data set. Interestingly, looking at each referendum, initiative, or election that Geneva has held between 1996 and 2005, 18-year olds consistently voted more than their slightly older peers. There seems to be some sort of a first time voting boost among 18 years old. This negative relationship between age and turnout, however, does not seem to pertain only to the canton of Geneva. There is a sizable strand of literature that comes to the same conclusions. Generally, young citizens tend to vote less than older citizens, but during the first few years of eligibility, there is a negative relationship between age and turnout (see Zeglovits and Aichholzer, 2014; Bhatti and Hansen, 2012*b*; Bhatti, Hansen and Wass, 2012; Konzelmann, Wagner and Rattinger, 2012).

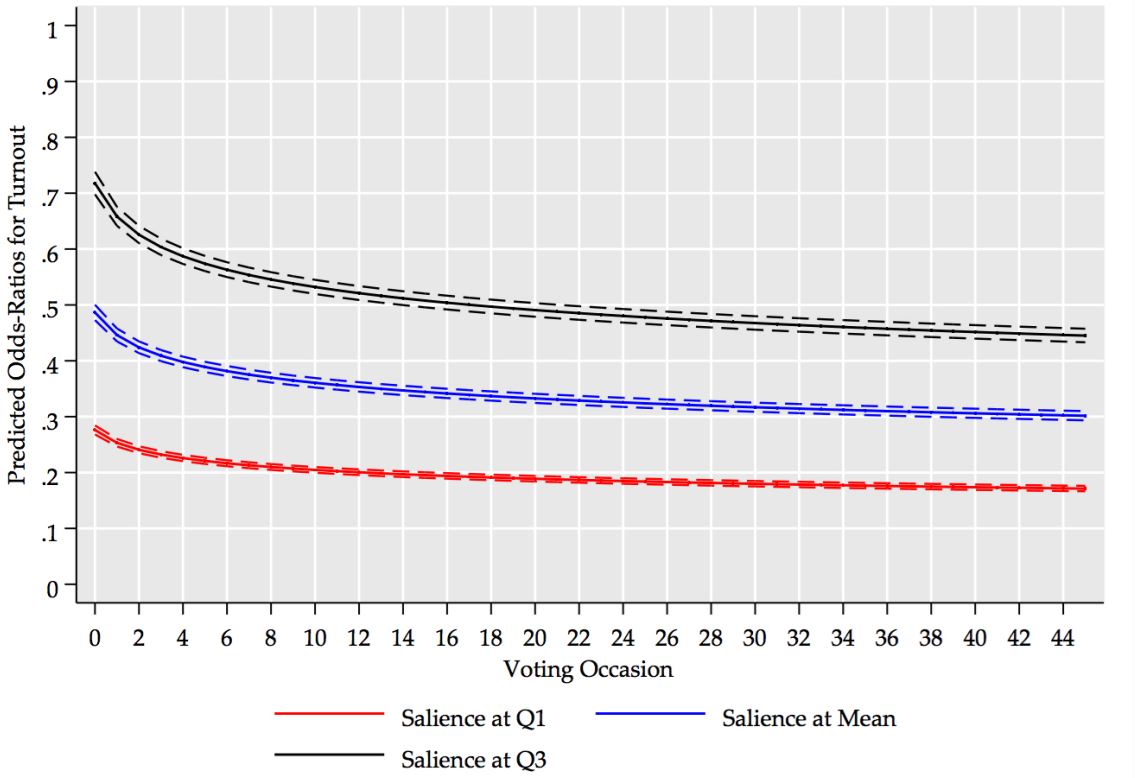

Figure 4.1: Effect of Time on Starting Levels and Growth Rates (Model C)

Given the circumstances that 18-year olds score higher turnout rates than their older peers, and that the base model regresses turnout on time, while controlling only for the salience of voting occasions, the negative effect of time on turnout is no longer surprising.

The habituation thesis implies a positive effect of time during the first years of eligibility. This positive effect should diminish over time and eventually become zero, as soon as voting or nonvoting habits are formed. Nevertheless, the results in Table 4.2 are not inconsistent with the habituation thesis, because one must repeat the same behavior a considerable number of times before it can become a habit. The base model is only meant to find an adequate growth curve regime for the subsequent

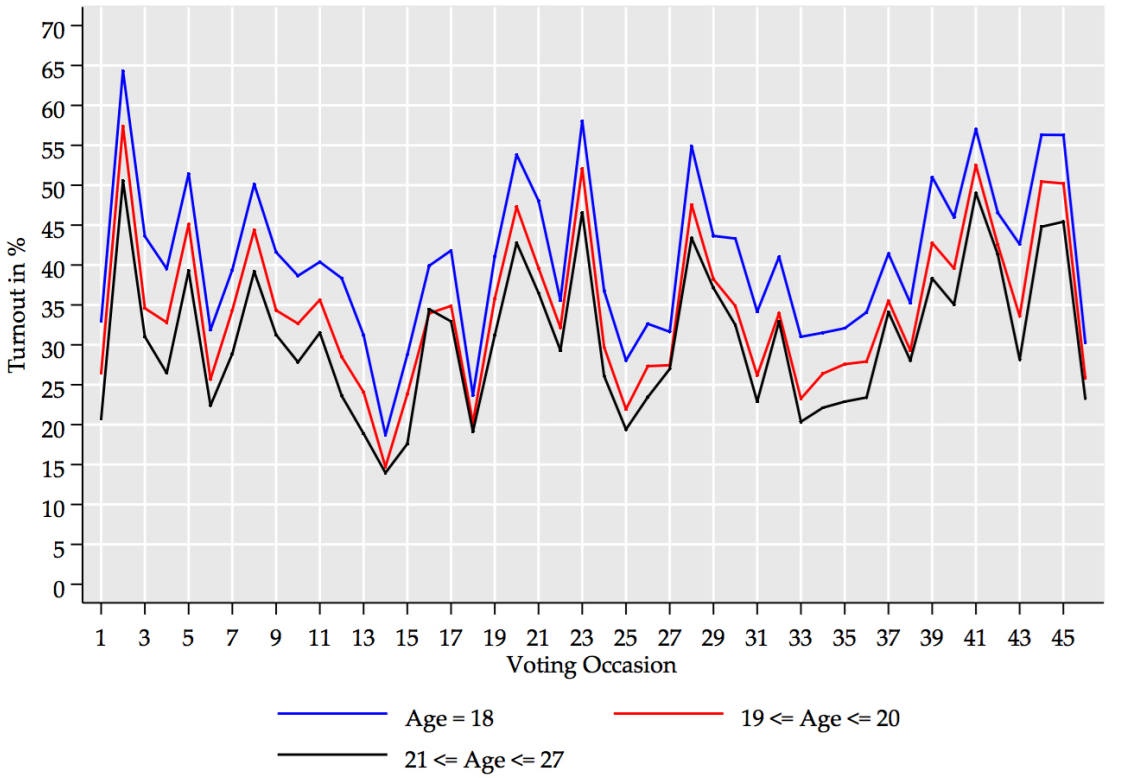

Figure 4.2: Differences in Turnout between Age Groups (1996-2005)

models and it does not account for previous participation behavior of the subjects. The next section, moves on to discuss the so-called sequential models, which record individuals' participation history in different lengths and then accounts for it, by treating all possible behavioral patterns as explanatory variables.

4.5.2 Sequential Models

4.5.2.1 Models with Records for the First Three Voting Occasions

In the next step, this study explores the effect of previous voting behavior patterns on the propensity to turnout. Using the growth curve regime settled in the initial analysis, the time point of the analysis is now shifted to $t = 4$. The first model in

this section is comprised of the logarithmic version of time, the vote salience, and a nominally scaled variable that measures the previous three votes in all possible behavioral sequences. The sequence variable is split into $2^3 - 1$ dummies, which are then incorporated into the model. Additionally, the model includes two interaction terms. The first interaction is between the logarithmic time and the vote salience, while the second one is between logarithmic time and the seven dummies, originating from the sequence variable. Model A in Table 4.3 shows the results from this analysis.

At first, this section interprets the results from Model A reflecting the impact on starting level for propensity to vote. The predicted odds-ratios of turnout in one's fourth voting occasion, if she or he did not participate in the first three occasions and the vote salience is held at the mean, are $e^{-5.946+(8.230*0.345)} = 0.045$. In contrast, the predicted odds-ratios of turnout in one's fourth voting occasion, if she or he did participate in all previous occasion and the vote salience is held at the mean, are $e^{-5.946+(8.230*0.345)+4.777} = 5.314$. In comparison to persons who abstained in all first three occasions, persons who voted in first three occasions, have on average 5.314 times higher odds of voting in the fourth one. As can be seen from Table 4.3, the voting behavioral pattern in the first three votes has a strong impact on the propensity to participate in the future voting occasions. In comparison to those who did not cast their vote in any of the first three voting occasions, those who voted at least once, have higher turnout odds-ratios in the fourth occasion (between 0.261 and 0.354 to 1).[4] Those who participated in two out of the three first votes, have higher turnout odds-ratios in the fourth voting occasion, than those who voted only once or did not vote at all. Similarly, those who voted in all the three first occasions have the highest propensity to turnout in the subsequent vote.

[4] $e^{-5.946+(8.230*0.345)+1.764}$ and $e^{-5.946+(8.230*0.345)+2.069}$ (salience is held at the mean).

Table 4.3: Multilevel Mixed-Effects Logistic Regression with Three Vote Sequences

Dependent Variable: **Voted** *(1 = Yes, 0 = No)*	*Model A* *Estimates*	*SE*	*Model B* *Estimates*	*SE*
Log(Time)	0.434***	0.023	0.436***	0.023
Salience of the Vote	8.230***	0.132	8.160***	0.135
Log(Time) × Salience of the Vote	-0.474***	0.049	-0.470***	0.050
Vote Sequence				
001	2.069***	0.069	2.066***	0.069
010	1.746***	0.067	1.744***	0.067
100	1.842***	0.060	1.839***	0.060
011	3.179***	0.072	3.177***	0.072
101	3.377***	0.068	3.375***	0.068
110	3.021***	0.063	3.018***	0.063
111	4.777***	0.053	4.771***	0.053
Vote Sequence × Log(Time)				
001 × Log(Time)	-0.279***	0.027	-0.279***	0.027
010 × Log(Time)	-0.223***	0.025	-0.223***	0.025
100 × Log(Time)	-0.259***	0.023	-0.261***	0.023
011 × Log(Time)	-0.411***	0.028	-0.412***	0.028
101 × Log(Time)	-0.483***	0.026	-0.485***	0.026
110 × Log(Time)	-0.391***	0.024	-0.392***	0.024
111 × Log(Time)	-0.631***	0.020	-0.633***	0.020
Female			0.028	0.020
Single			0.062	0.034
Native of Geneva			0.123***	0.020
Popular Vote			-0.019	0.013
Federal Level			0.039**	0.013
Cantonal Level			0.024**	0.008
Communal Level			0.004	0.009
Intercept	-5.946***	0.062	-6.101***	0.073
Var. in the Slope for Log(Time)	0.357***	0.009	0.358***	0.009
Var. in the Intercept	3.438***	0.077	3.437***	0.077
Cov. for Intercept and Log(Time)	-0.775***	0.024	-0.776***	0.024
AIC	512420.7		512377.6	
BIC	512656.2		512691.5	
N × T	547'519		547'519	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The trend of the effect is clear; the more one votes in the first three occasions the higher her or his predicted odds-ratios of participating in the subsequent one. Furthermore, apart from the differences between the sequences '010' and '100', and '011' and '110', all the other voting sequences are statistically different from each other at a 5 % significance level.

Having discussed the starting level for propensity to vote, this section turns to the analysis of how previous participation behavior impacts the growth rate of the curve over time. After controlling for behavioral patterns in the model, the effect of logarithmic time on the propensity to turnout becomes positive. For one-unit increase in logarithmic time, the expected turnout change in log odds is 0.434, ceteris paribus. If this is translated into a change in odds, one can expect a 54.342 % increase in the odds of turnout for one-unit increase in logarithmic time, ceteris paribus.[5] This result is valid, however, only for individuals who did not vote in the first three occasions and if the vote salience were at the hypothetical value of zero. To help interpreting the magnitudes of growth curve estimates, the results from Model A (Table 4.3) are plotted in Figure 4.3.

Because the turnout decision is expected to become routine or habitual only through numerous repetition of the same behavior over time, the most interesting cohorts are here those with a constant voting behavior in the first three votes, i.e., those who either participated or abstained in the first three voting occasions. Hence, Figure 4.3 visualizes the growth curves for both of the aforementioned groups. In both cases, vote salience is held at the first quartile, the mean, and the third quartile.[6] The growth curve for individuals who abstained in the first three votes is slightly positive. It starts

[5]Here it is important to note that the scale of time is given in logarithmic form, where a "one-unit" change corresponds to roughly two and a half years change in linear time.

[6]Salience of the voting occasion is 0.26 at the first quartile, 0.35 at the mean, and 0.40 at the third quartile.

at a very low level (depending on the salience level, 0.022, 0.045, and 0.072 odds-ratios) and continues to grow slightly until it reaches a level of 0.072, 0.124, and 0.180 odds-ratios. It is obvious from these results that for those who did not participate in the first three occasions, the turnout odds-ratios remain very low throughout the observation period. In contrast, the fluctuation over time in voters' turnout odds is much higher for individuals who voted in all of the first three occasions. Figure 4.3 illustrates that those individuals have on average very high odds of participating in the subsequent occasion (here coded as 0). The growth curve starts fairly high (for salience at the mean, odds-ratio = 5.314), but has a clear negative trend. Those who voted in the first three elections, have on average high odds of participating in the next few voting occasions. This trend does not hold very long; the odds of participating drop rapidly as time passes (from 5.314 to roughly 1.368).

Hence, the results from Model A (see Table 4.3) and Figure 4.3 suggest that habit formation in voting behavior might not operate in the same way among abstainers and voters, respectively. There seems to be an asymmetry in the pace of habit occurrence among the aforementioned cohorts. Abstaining in the first three voting occasions, seems to set individuals on a path of very low participation odds in the future. However, this is not valid for the opposite group. Active participation in first three voting occasions when one first becomes eligible to vote, does not seem to guarantee the same stability in the turnout behavior over the subsequent occasions, as it is the case with abstainers.

These results lead to the conclusion that a transition from being a regular voter to a potential abstainer is more likely than vice versa. Habit formation seems to take form faster among nonvoters than with voters. In fact, the results show that recently eligible individuals who participate in the first three occasions, do not develop a habit of voting that will ensure their constant participation in the future. Nevertheless,

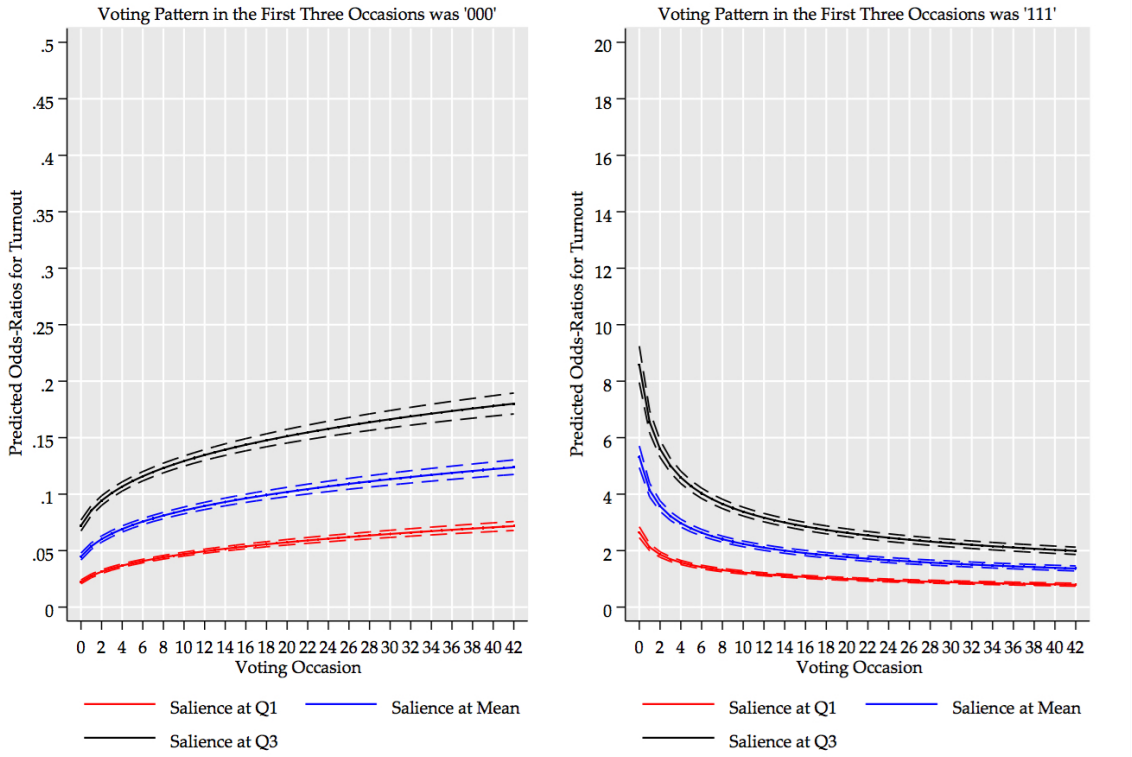

Figure 4.3: Effect of Time on Starting Levels and Growth Rates for Individuals Who Had Constant Behavior in the First Three Voting Occasions

despite a roughly 4-unit reduction in odds-ratios over time (for salience at the mean), individuals who voted in the first three occasions have throughout the observation period considerably higher turnout odds than those who abstained.

Other interesting results to emerge from Model A (Table 4.3) are the interaction terms between the sequence dummies and logarithmic time, and between salience and logarithmic time, respectively. The interaction between the sequence dummies and logarithmic time measures the effect of different voting behavior patterns over time with reference to the individuals who abstained in the first three voting occasion. The results illustrate a clear trend. The positive effect of logarithmic time on propensity to turnout loses strength as time passes. This holds true for all behavior sequences

during the first three occasions. In other words, voting behavior in the first three occasions has an immediate and strong effect on propensity to vote in the future, with this positive influence diminishing over time. Interestingly, the negative effect of the interaction between sequence dummies and logarithmic time is stronger for those individuals who participated more in the first three elections. For individuals who participated in all of the first three occasions, the negative effect of the interaction is even strong enough to turn the developmental trajectory into a declining curve (see Figure 4.3). These results suggest that the more one participates in the first three voting occasions, the higher the behavior instability in the subsequent turnout (see Table 4.3 and Figure 4.3). This finding is in line with one of the premises of this study, that voting behavior does not operate in the same way among typical voters and nonvoters.

The interaction term between salience and logarithmic time measures whether the effect of salience increases or decreases over time. As elucidated in Section 3, this is an important indicator for the habituation thesis. The process of habit-formation should lead to diminishing effects of the vote salience over time. In other words, as time passes by, citizens acquire (non-) participation habits, thereby they are expected to becoming less responsive to the salience of the vote. Thus, a striking observation to emerge from results in Table 4.3 is the negative sign and the size of the coefficient for the interaction term between logarithmic time and vote salience. Although the effect of the salience remains significant throughout the observation period, this result is a plausible indicator for the possible existence of habit-formation in turnout decision. Concretely, it suggests that the positive effect of vote salience loses strength over time. This phenomenon is entirely in agreement with the habituation thesis, indicating that the predictive power of salience becomes weaker over time. This implies that turnout decision may become more of a habit than a spontaneous response to

exogenous stimulations and mobilization factors.

Table 4.3 also shows the results from Model B, which is an extension to Model A. It includes some additional explanatory variables, such as gender, marital status, canton of origin, vote type, and administrative level of the vote. Despite the additional covariates, the coefficient sizes for logarithmic time, sequence variable, salience, and their interaction terms remain almost identical to those in Model A (see Table 4.3). In voting occasions, where also cantonal issues or elections are at stake, individuals have 2.429 % higher turnout odds. The same holds true for voting occasions at federal level; in comparison to voting occasions that are held at the cantonal or/and communal level, the odds of participating in federal votes/elections are 3.977 % higher. Furthermore, eligible voters who are natives of Geneva have on average 13.088 % higher turnout odds than individuals who moved to Geneva from other Swiss cantons, ceteris paribus. The reason for this may lie in the fact that the native population has higher level of internal political efficacy and feels more connected to the local and cantonal politics, thus generating a higher turnout than their peers from other cantons. The coefficients for gender, marriage, vote type (popular vote vs. election), and votes at communal level do not achieve statistical significance.

Table 4.3 also contains the estimated variances for the intercept and the slope of logarithmic time. The random intercept accounts for all individual-specific characteristics that cause some individuals to have higher propensity to turnout than others. By including a random intercept into the model, one assumes random heterogeneity in individuals' propensity to turnout that persists throughout the observation period. In Models A and B (see Table 4.3) the estimated variances for the random intercept are fairly high (3.438 and 3.437, respectively), implying substantial variability in the odds of participating among individuals at the beginning of the observation period. This result is not surprising, because it is well-known that people have very different

underlying traits affecting their propensity to vote or abstain once they reach eligibility age (e.g., Franklin, 2004; Plutzer, 2002; Denny and Doyle, 2009). Since this study's data lacks covariates that allow to better control for differences in underlying traits at eligibility age, the whole variation is caught by the intercept of the model. Furthermore, Models A and B (see Table 4.3) allow logarithmic time to have different effect for each individual. The estimated variance in the random slope is in both models fairly large (0.357 and 0.358, respectively), implying a high variability in the impact of time on propensity to vote across individuals.

4.5.2.2 Models with Records for the First Six Voting Occasions

Because habits are formed only through steady repetition of the same behavior over time, it seems reasonable to extend the model in order to include more than the voting history of individuals in the first three voting occasions. In this section, therefore, I shift the time point of the analysis to $t = 7$, where the sequence variable records now each individual's participation pattern during the first six voting occasions after they reached eligibility age. This allows me to explore whether a repetition of the same voting behavior during the first six voting occasions is sufficient to make future turnout decision an automated response or habitual.

The results from this analysis are contained in Table 4.4 (see Models C and D). Those two models are very similar to the ones from the previous section, the only difference is in the variable that records the voting sequences. They both include now 63 or $2^6 - 1$ dummies originating from the sequence variable.[7] Model C contains the results from the regression without the additional control variables, while Model D includes also control variables such as gender, marital status, canton of origin, vote

[7]Note that most of the sequence dummies are not reported because of space constraints, but the full results are available in the Appendix (see Table 4.7).

Table 4.4: Multilevel Mixed-Effects Logistic Regression with Six Vote Sequences

Dependent Variable:	*Model C*		*Model D*	
Voted *(1 = Yes, 0 = No)*	*Estimates*	*SE*	*Estimates*	*SE*
Log(Time)	0.533***	0.027	0.540***	0.028
Salience of the Vote	8.451***	0.144	8.325***	0.148
Log(Time) × Salience of the Vote	-0.561***	0.055	-0.560***	0.055
100000	1.404***	0.092	1.402***	0.092
110000	1.958***	0.125	1.954***	0.125
111000	2.881***	0.143	2.878***	0.143
111100	3.508***	0.133	3.502***	0.134
111110	4.584***	0.106	4.578***	0.106
111111	6.005***	0.075	6.001***	0.075
Vote Sequence × Log(Time)				
100000 × Log(Time)	-0.203***	0.037	-0.205***	0.037
110000 × Log(Time)	-0.158**	0.049	-0.160**	0.049
111000 × Log(Time)	-0.301***	0.057	-0.303***	0.057
111100 × Log(Time)	-0.398***	0.053	-0.400***	0.053
111110 × Log(Time)	-0.572***	0.042	-0.575***	0.042
111111 × Log(Time)	-0.771***	0.030	-0.774***	0.030
Female			0.037	0.019
Single			0.083*	0.035
Native of Geneva			0.083***	0.019
Popular Vote			-0.018	0.014
Federal Level			0.058***	0.014
Cantonal Level			0.029**	0.009
Communal Level			0.011	0.010
Intercept	-6.475***	0.071	-6.637***	0.081
Var. in the Slope for Log(Time)	0.344***	0.009	0.345***	0.009
Var. in the Intercept	2.713***	0.071	2.716***	0.071
Cov. for Intercept and Log(Time)	-0.672***	0.024	-0.674***	0.024
AIC	437718		437681.2	
BIC	439189.8		439230.5	
N × T	472'585		472'585	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes: Majority of sequence dummies have been suppressed due to space reasons. Full results are contained in Table 4.7 in the Appendix

type, and administrative level of the vote.

As it was the case in the previous section, including covariates such as gender, marital status, canton of origin, vote type, and administrative level of the vote, does have only a minimal impact on the coefficient sizes for logarithmic time, sequence variable, salience, and their interaction terms. Apart from the fact that now the estimate of the variable "single" achieves statistical significance, all the coefficients' signs and significance levels of the aforementioned control variables remain similar to those in Model B. Therefore, for simplicity reasons, unless mentioned otherwise, the interpretation of the results below refers to the model without the additional control variables (see Model C in Table 4.4).

As mentioned above, the most interesting cohorts are those with a consistent voting behavior in the first six occasions, namely individuals who either participated in the first six voting occasions or abstained. The growth curves for these two groups of individuals are plotted in Figure 4.4. The trajectory trends are very similar to those from the previous section, where only the first three voting sequences were recorded. Individuals abstaining in the first six voting occasions have very low turnout odds in the seventh occasion (starting point of the growth curve).[8] Although, the predicted odds-ratios for voting increase slightly over time, they remain at a very low level throughout the observation period. For individuals who did not cast their ballot in the first six voting occasions the turnout odds-ratio in the next one is only 0.028 to 1 (salience held at the mean). By the end of the observation period or 38 voting occasions later, the odds-ratio for participating reaches the level of 0.1 to 1 (salience at the mean). Hence, for those individuals the propensity to turnout does not exceed 10 % in any future voting occasion. In other words, the growth curve for those who abstained in the first six occasions is practically flat, indicating very low probability

[8]In Figure 4.4 the seventh voting occasion is coded as 0.

for future participation.

A comparison of Figures 4.3 and 4.4 reveals that individuals who abstained in the first six occasions, have in the future overall lower turnout odds than those who abstained in the first three votes. From these results one can conclude that the longer the abstaining path at the beginning of the eligibility age, the lower the odds of participating in the subsequent occasions. Hence, missing the opportunity to participate in the first six occasions, paves the path for vote abstention throughout the observation period. A transition from nonvoting to voting seems very unlikely for those individuals.

In contrast to the above-mentioned group of abstainers, individuals who voted in the first six occasions behave very differently. Figure 4.4 illustrates that the predicted turnout odds-ratios for this group are less stable, hence dropping dramatically over time. In the seventh voting occasion (coded as 0 in Figure 4.4) the turnout odds are roughly 11 times higher than for those who abstained in the first six occasions. By the end of the observation period the turnout odds in favor of those who participated in the first six occasions drop at roughly below 3 to 1 (salience is held at the mean).

While the predicted turnout odds-ratios for those who skipped their first six voting opportunities remain practically unchanged throughout the observation period, this is not the case with those who during the same period in their lives never missed the opportunity to participate. In light of these findings one must conclude that habits may be formed much faster among nonvoters than it is the case with voters. As can be seen in Table 4.8 and Figure 4.7 this does not change also if one controls for voting patterns during the first seven voting occasions.

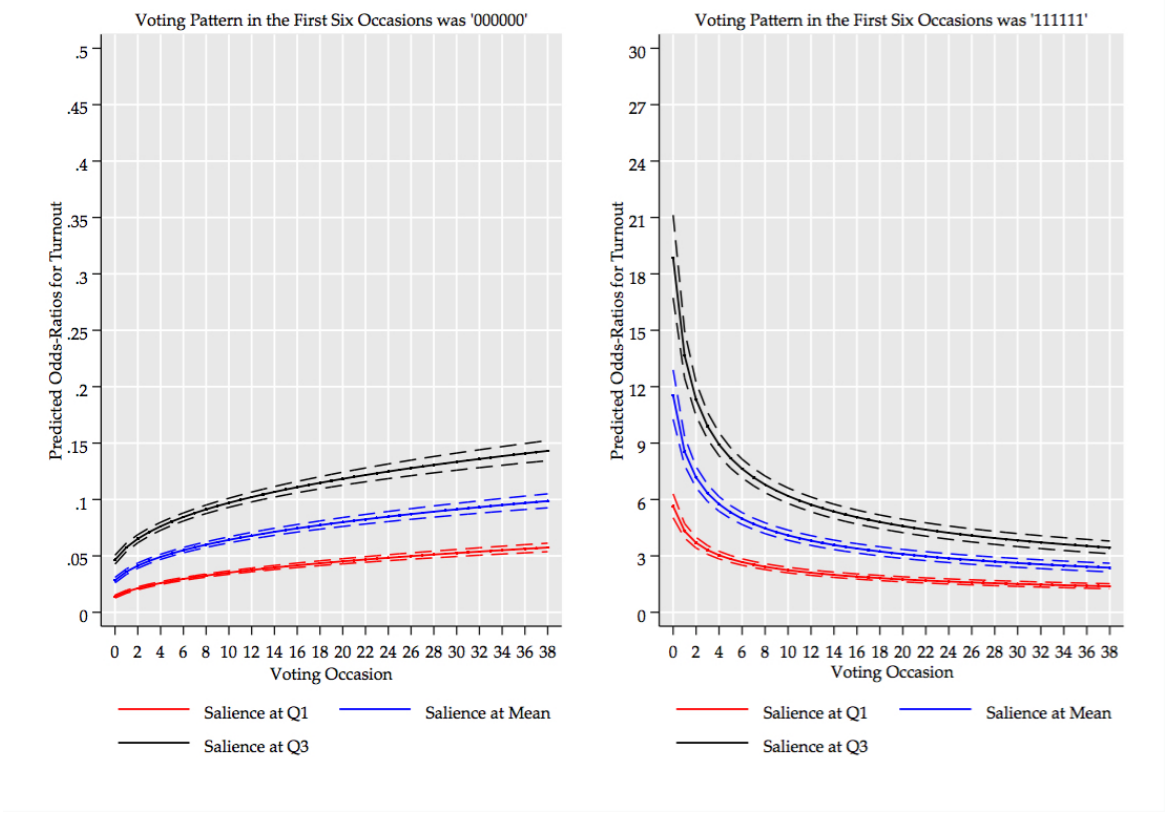

Figure 4.4: Effect of Time on Starting Levels and Growth Rates for Individuals Who Had Constant Behavior in the First Six Voting Occasions

These results do not, however, suggest that active participation during the first few occasions after reaching eligibility age is unimportant for the propensity to vote in the future. In contrary, findings in Table 4.4 and Figure 4.4 make it clear that first-time eligible voters who participate in the first six occasions, have throughout the observation period much higher participation odds than those who skip their first six voting opportunities. Furthermore, a comparison between Figures 4.3, 4.4, 4.5, 4.6, 4.7 and Tables 4.3, 4.5, 4.6, 4.7, 4.8 (see also Appendix) reveals that individuals who voted in the first six or seven occasions, have in the future overall higher turnout odds-ratios than those who voted only in the first five, four, or three occasions. These

results suggest that the more first-time eligible voters participate during the first few voting occasions, the higher are their turnout odds in the future.

Another important observation to emerge from the results shown in Table 4.4 and Figure 4.4 is the effect of the interaction term between salience and logarithmic time. During the first votes after a citizen reaches eligibility age, salience is expected the have largest effect on her or his propensity to participate. As the number of voting occasions to which individuals are exposed increases, the positive effect of the vote salience diminishes. This means that, with time, individuals become ever less responsive to external influences, e.g., salience of the vote. As mentioned in the previous section, the fact that salience loses strength over time is a strong argument for the habituation thesis.

4.5.2.3 Additional Analysis: Adding Vote Proximity as a Second Attribute of the Voting Occasions

Apart from vote salience, there are also other attributes of elections that would qualify as inputs to conscious thought about participation. The consummate rational choice model of turnout is that of Downs (1957). It includes a P term (pivotality of the vote), which correlates with the closeness of the vote. Thus, it stands to reason that conscious turnout decisions result in participation when the election is close. The current study measures the proximity of a voting occasion by capturing the gap between "for" and "against" votes in each referendum or initiative. One problem here is that in proportional electoral systems, like the one in Switzerland, there is no tipping point that clearly defines when one loses or wins an election, as it is the case with referendums and initiatives. Furthermore, since 1959 the Swiss Government has had more or less the same composition; the number of ministers[9] belonging to each of

[9]Members in the Swiss Federal Council (*germ.* Bundesrat).

the four biggest parties is usually well known before the elections. Following this, the current study forgoes a measure for the closeness of elections for political office and instead relies only on direct democratic votes.

Two multilevel mixed-effects logistic regression models are calculated in order to find out whether the proximity measure operates with regard to turnout in the same fashion as the salience measure. The results are shown in Table 4.8 (see Appendix). Both models are almost identical to Model B from Table 4.3. Only that now Model K includes the measure of proximity as a predictor, while Model L extends the model further by adding an interaction term between proximity and time.

As the results from Model K in Table 4.8 show, there is no statistically significant impact of proximity of the vote on turnout (p-Value = 0.195). The same holds true for the interaction term in Model L, whose coefficient is far away from being statistically significant (t-Value = 0.462). Despite the exclusion of the elections from the sample, the coefficients of the other variables in both models remain very similar to those in Table 4.3. This speaks for the robustness of the results.

Although Downs' (1957) model projects an increase in turnout when a political contest is close, the current study's fails to support this claim. The reasons for this results can be twofold: *a*) Citizens may not be aware about the proximity of political contests, because of the high frequency of such contests in Switzerland, or *b*) the way this study measures the proximity of an election is not adequate. A potential problem with proximity measure can be the fact that sometimes there exists a discrepancy between the perceived and the real closeness of a political contest. For example, if the vote at hand is about an issue that is clearly discriminatory toward a certain segment of the population, say immigrants, the perceived closeness of the "for" and "against" votes might be distorted due to social desirability biases. But then the same holds true for other measurements of vote closeness, such as those derived from opinion surveys

before the voting occasion. Although the bias here would go the opposite direction, the distortion of proximity measure would probably be sizeable.

In awareness about the potential problems with the measure of proximity this study is unable to claim with certainty whether the non-effect of proximity is a consequence of the proximity of the vote not being a good predictor of turnout per se, or it had more to do with the way how the proximity was measured.[10] In a nutshell, this measure does not deem useful for tracing habituation in voting behavior, like it was the case with vote salience.

4.6 Conclusions

In this study, I have explored a unique data set with up to 46 occasions for individuals to vote. Actual turnout is being recorded, so that the study does not suffer the usual problems of systematic measurement error in self-reports.

The main objective of this study was to find out whether there is evidence that turnout decisions become a habit, and if so, how fast. Another objective was to examine whether habit-formation operates in the same way among typical voters and abstainers, respectively.

In absence of implicit or neurological measures for habituation this study uses the salience of the vote as a proxy for conscious thought. The idea is that if salience, as a very strong predictor of turnout, becomes less predictive of future behavior, this would imply that the citizens have indeed acquired an element of inertia in turnout that is probably due to habit-forming effects of voting behavior. Otherwise there is no compelling reason why they should not respond to the salience of the vote like at the beginning of their eligibility. As can be gathered from the results section, the impact

[10] Also the study of Kirchgässner and Schulz (2005) finds no support for the thesis that election closeness has a clear impact on turnout.

of salience is the highest at the beginning of the eligibility, but then its predictive power of turnout lessens as time passes by. This finding, as such, is in agreement with the habituation thesis. To further strengthen the case for habituation thesis this study also finds that the more one has the same behavior in the past, the higher the chance that she/he will keep the same pattern in the future.

Another key strength of this research is the fact that it extends our knowledge of habituation with regard to the asymmetry in the pace of habit acquirement among typical voters and nonvoters. As the results of this study indicate, habit-formation does not seem to operate in the same way among typical voters and nonvoters, respectively. Missing the opportunity to cast the ballot in the first few voting occasions after reaching eligibility age, seems to set one in a path of abstaining for the remaining of the observation period. The longer the path of abstaining at the beginning of eligibility, the lower the chance of transition from nonvoting to voting. Those who did not participate in the first six or seven occasions after reaching eligibility age, have a propensity of less than 10 % to vote in any future voting occasion. One can thus conclude that these individuals have become habitual nonvoters. The normative implications of this finding are clear; if a person who just turned 18 does not vote in the first few voting occasions, the odds are high that this person will be set in a path of lifelong passiveness with regard to participation.

The results show that the same is not valid for typical voters. Those who participate in the first three, four, five, six, or even seven first voting occasions have a very high propensity of voting in the next few occasions. Although in comparison to any other cohort in the sample, the turnout odds for this group remain much higher throughout the observation period, they drop rapidly as time passes by. Even after controlling for the first seven votes, the variation in turnout for this group is still quite large. In other words, voting in the first seven occasions, makes one, in comparison to individuals with

other voting histories, a more probable voter, however, it does not seem to be enough to put her/him in a path of permanent activity. Hence, in light of these results one can conclude that a transition from voting to nonvoting, even after voting in the first seven occasions, is more probable, than it is the case with the transitioning from nonvoting to voting.

Two innovations yield the findings of the current study surplus value beyond the usual bona fides of replication. First, no other study to date has explored such a long series of votes. Typically, studies consider 2-4 time periods, which one would deem a bit short to reliably determine persistence, let alone habituation. With records for up to 46 votes, I believe that this study's findings truly add to the extant literature, strengthening the case for habituation. Second, to the best of my knowledge, none of the existing studies to date has been able to illustrate which group, the habitual voters or the habitual nonvoters, show higher variability in turnout over time. This asymmetry that this study has identified therefore assists to further extend our understanding of the role of habits in voting behavior.

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Appendix

Table 4.5: Multilevel Mixed-Effects Logistic Regression with Four Vote Sequences

Dependent Variable: **Voted** *(1 = Yes, 0 = No)*	*Model E* *Estimates*	*SE*	*Model F* *Estimates*	*SE*
Log(Time)	0.508***	0.025	0.512***	0.025
Salience of the Vote	8.398***	0.135	8.300***	0.139
Log(Time) × Salience of the Vote	-0.541***	0.051	-0.538***	0.051
Vote Sequence				
0001	2.044***	0.082	2.044***	0.082
0010	1.693***	0.088	1.692***	0.088
0100	1.599***	0.080	1.596***	0.080
1000	1.660***	0.071	1.657***	0.071
0011	2.943***	0.102	2.937***	0.102
0101	2.982***	0.109	2.984***	0.109
0110	2.647***	0.104	2.650***	0.104
1001	3.102***	0.094	3.097***	0.094
1010	2.914***	0.094	2.910***	0.094
1100	2.465***	0.084	2.460***	0.084
0111	3.874***	0.094	3.871***	0.094
1011	4.051***	0.088	4.049***	0.088
1101	3.874***	0.083	3.872***	0.083
1110	3.737***	0.079	3.735***	0.079
1111	5.335***	0.060	5.329***	0.060
Vote Sequence × Log(Time)				
0001 × Log(Time)	-0.365***	0.032	-0.366***	0.032
0010 × Log(Time)	-0.199***	0.034	-0.201***	0.034
0100 × Log(Time)	-0.209***	0.030	-0.210***	0.030
1000 × Log(Time)	-0.235***	0.027	-0.236***	0.027
0011 × Log(Time)	-0.380***	0.041	-0.381***	0.041
0101 × Log(Time)	-0.443***	0.043	-0.444***	0.043
0110 × Log(Time)	-0.356***	0.041	-0.357***	0.041
1001 × Log(Time)	-0.492***	0.036	-0.493***	0.036

1010 × Log(Time)	-0.408***	0.036	-0.410***	0.036
1100 × Log(Time)	-0.266***	0.032	-0.267***	0.032
0111 × Log(Time)	-0.474***	0.037	-0.476***	0.037
1011 × Log(Time)	-0.580***	0.034	-0.581***	0.034
1101 × Log(Time)	-0.546***	0.032	-0.547***	0.032
1110 × Log(Time)	-0.455***	0.030	-0.458***	0.030
1111 × Log(Time)	-0.723***	0.023	-0.725***	0.023
Female			0.038	0.020
Single			0.068*	0.034
Native of Geneva			0.112***	0.020
Popular Vote			-0.018	0.013
Federal Level			0.047***	0.013
Cantonal Level			0.025**	0.009
Communal Level			0.010	0.009
Intercept	-6.251***	0.066	-6.412***	0.076
Var. in the Slope for Log(Time)	0.337***	0.009	0.337***	0.009
Var. in the Intercept	3.082***	0.074	3.081***	0.074
Cov. for Intercept and Log(Time)	-0.701***	0.023	-0.703***	0.023
AIC	485492.5		485449.4	
BIC	485905.6		485940.7	
N × T	521'490		521'490	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

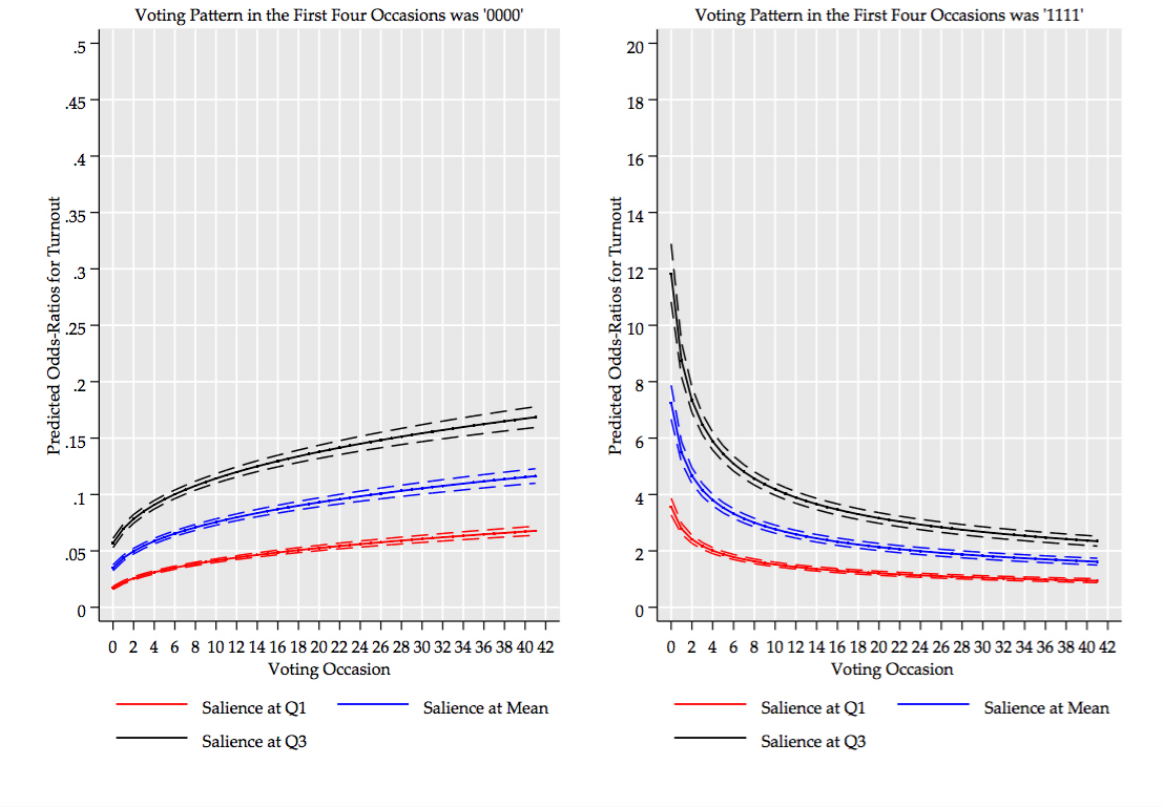

Figure 4.5: Effect of Time on Starting Levels and Growth Rates for Individuals Who Had Constant Behavior in the First Four Voting Occasions

Table 4.6: Multilevel Mixed-Effects Logistic Regression with Five Vote Sequences

Dependent Variable: **Voted** *(1 = Yes, 0 = No)*	*Model G* *Estimates*	*SE*	*Model H* *Estimates*	*SE*
Log(Time)	0.525***	0.026	0.531***	0.026
Salience of the Vote	8.419***	0.140	8.296***	0.145
Log(Time) × Salience of the Vote	-0.551***	0.053	-0.548***	0.053
Vote Sequence				
00001	2.085***	0.097	2.084***	0.097
00010	1.746***	0.102	1.748***	0.102
00100	1.651***	0.101	1.651***	0.101
01000	1.455***	0.095	1.452***	0.095
10000	1.512***	0.082	1.510***	0.082
00011	2.773***	0.130	2.769***	0.130
00101	2.708***	0.160	2.704***	0.160
00110	2.496***	0.137	2.493***	0.137
01001	2.482***	0.135	2.479***	0.135
01010	2.528***	0.155	2.531***	0.155
01100	2.317***	0.132	2.317***	0.132
10001	2.718***	0.125	2.716***	0.126
10010	2.661***	0.124	2.658***	0.124
10100	2.515***	0.117	2.509***	0.118
11000	2.247***	0.105	2.246***	0.105
00111	3.907***	0.149	3.903***	0.149
01011	3.290***	0.146	3.293***	0.146
01101	3.637***	0.159	3.643***	0.159
01110	3.380***	0.147	3.383***	0.147
10011	3.892***	0.134	3.886***	0.134
10101	3.896***	0.142	3.895***	0.143
10110	3.394***	0.133	3.396***	0.133
11001	3.438***	0.130	3.428***	0.130
11010	3.303***	0.119	3.303***	0.119
11100	3.203***	0.110	3.203***	0.110
01111	4.295***	0.116	4.292***	0.116
10111	4.585***	0.111	4.581***	0.111
11011	4.482***	0.106	4.480***	0.106
11101	4.300***	0.101	4.297***	0.101
11110	4.142***	0.096	4.139***	0.096
11111	5.657***	0.067	5.652***	0.067
Vote Sequence × Log(Time)				
00001 × Log(Time)	-0.297***	0.039	-0.298***	0.039

00010 × Log(Time)	-0.302***	0.040	-0.303***	0.041
00100 × Log(Time)	-0.210***	0.040	-0.211***	0.040
01000 × Log(Time)	-0.187***	0.037	-0.188***	0.037
10000 × Log(Time)	-0.201***	0.032	-0.203***	0.032
00011 × Log(Time)	-0.408***	0.054	-0.410***	0.054
00101 × Log(Time)	-0.332***	0.064	-0.335***	0.064
00110 × Log(Time)	-0.300***	0.056	-0.302***	0.056
01001 × Log(Time)	-0.290***	0.053	-0.292***	0.053
01010 × Log(Time)	-0.374***	0.063	-0.377***	0.063
01100 × Log(Time)	-0.300***	0.053	-0.302***	0.053
10001 × Log(Time)	-0.380***	0.049	-0.382***	0.050
10010 × Log(Time)	-0.400***	0.048	-0.402***	0.048
10100 × Log(Time)	-0.309***	0.046	-0.311***	0.046
11000 × Log(Time)	-0.244***	0.041	-0.246***	0.041
00111 × Log(Time)	-0.539***	0.061	-0.540***	0.061
01011 × Log(Time)	-0.376***	0.059	-0.376***	0.059
01101 × Log(Time)	-0.518***	0.064	-0.521***	0.064
01110 × Log(Time)	-0.392***	0.060	-0.395***	0.060
10011 × Log(Time)	-0.621***	0.054	-0.622***	0.054
10101 × Log(Time)	-0.593***	0.057	-0.595***	0.057
10110 × Log(Time)	-0.452***	0.053	-0.455***	0.053
11001 × Log(Time)	-0.400***	0.051	-0.401***	0.051
11010 × Log(Time)	-0.435***	0.047	-0.437***	0.047
11100 × Log(Time)	-0.373***	0.043	-0.376***	0.043
01111 × Log(Time)	-0.514***	0.046	-0.516***	0.046
10111 × Log(Time)	-0.645***	0.044	-0.646***	0.044
11011 × Log(Time)	-0.635***	0.042	-0.636***	0.042
11101 × Log(Time)	-0.502***	0.040	-0.505***	0.040
11110 × Log(Time)	-0.545***	0.038	-0.548***	0.038
11111 × Log(Time)	-0.731***	0.026	-0.733***	0.026
Female			0.035	0.019
Single			0.080*	0.034
Native of Geneva			0.096***	0.019
Popular Vote			-0.014	0.014
Federal Level			0.051***	0.014
Cantonal Level			0.023**	0.009
Communal Level			0.011	0.009
Intercept	-6.397***	0.069	-6.558***	0.079
Var. in the Slope for Log(Time)	0.339***	0.009	0.340***	0.009
Var. in the Intercept	2.834***	0.071	2.836***	0.072
Cov. for Intercept and Log(Time)	-0.677***	0.023	-0.679***	0.023
AIC	460904.7		460867.2	

BIC	461671.7	461712
N × T	496'740	496'740

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

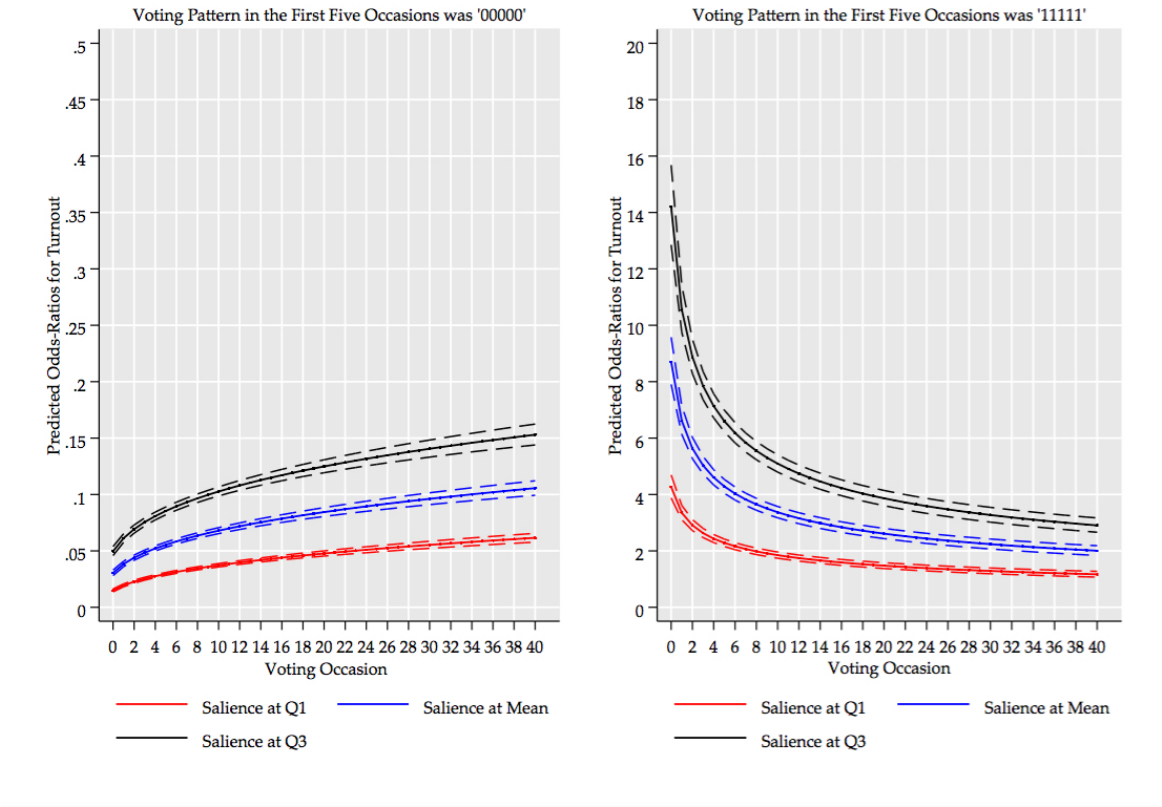

Figure 4.6: Effect of Time on Starting Levels and Growth Rates for Individuals Who Had Constant Behavior in the First Five Voting Occasions

Table 4.7: Multilevel Mixed-Effects Logistic Regression with Six Vote Sequences

Dependent Variable:	*Model C*		*Model D*	
Voted *(1 = Yes, 0 = No)*	*Estimates*	*SE*	*Estimates*	*SE*
Log(Time)	0.533***	0.027	0.540***	0.028
Salience of the Vote	8.451***	0.144	8.325***	0.148
Log(Time) × Salience of the Vote	-0.561***	0.055	-0.560***	0.055
000000	0.000	.	0.000	.
000001	1.855***	0.120	1.855***	0.120
000010	1.800***	0.115	1.801***	0.116
000100	1.542***	0.116	1.544***	0.116
001000	1.478***	0.115	1.478***	0.115
010000	1.266***	0.108	1.262***	0.108
100000	1.404***	0.092	1.402***	0.092
000011	3.074***	0.171	3.071***	0.171
000101	2.996***	0.201	3.005***	0.201
000110	2.261***	0.173	2.263***	0.174
001001	2.844***	0.199	2.844***	0.199
001010	1.996***	0.219	1.991***	0.219
001100	2.276***	0.171	2.275***	0.171
010001	2.530***	0.193	2.532***	0.193
010010	2.154***	0.171	2.151***	0.171
010100	2.087***	0.189	2.093***	0.189
011000	2.198***	0.156	2.197***	0.156
100001	2.741***	0.162	2.734***	0.162
100010	2.563***	0.162	2.562***	0.162
100100	2.239***	0.152	2.233***	0.152
101000	2.275***	0.142	2.267***	0.142
110000	1.958***	0.125	1.954***	0.125
000111	3.414***	0.203	3.406***	0.203
001011	3.272***	0.240	3.268***	0.240
001101	3.230***	0.230	3.225***	0.230
001110	3.052***	0.229	3.052***	0.229
010011	3.089***	0.222	3.086***	0.222
010101	3.665***	0.272	3.661***	0.273
010110	2.840***	0.199	2.854***	0.199
011001	3.113***	0.244	3.113***	0.244
011010	3.007***	0.229	3.013***	0.230
011100	3.007***	0.192	3.011***	0.192
100011	3.288***	0.201	3.283***	0.201
100101	3.710***	0.209	3.707***	0.209

100110	3.348***	0.203	3.349***	0.203
101001	3.220***	0.201	3.215***	0.201
101010	3.515***	0.202	3.516***	0.202
101100	3.131***	0.174	3.137***	0.174
110001	3.502***	0.186	3.504***	0.186
110010	3.170***	0.180	3.158***	0.180
110100	3.060***	0.152	3.058***	0.152
111000	2.881***	0.143	2.878***	0.143
001111	4.451***	0.199	4.448***	0.199
010111	4.009***	0.219	4.004***	0.219
011011	4.200***	0.223	4.204***	0.223
011101	4.211***	0.225	4.213***	0.225
011110	3.626***	0.182	3.623***	0.183
100111	4.272***	0.187	4.262***	0.187
101011	4.206***	0.197	4.203***	0.197
101101	3.927***	0.204	3.921***	0.204
101110	3.958***	0.181	3.957***	0.181
110011	4.099***	0.190	4.090***	0.190
110101	4.057***	0.187	4.055***	0.187
110110	3.983***	0.168	3.980***	0.168
111001	3.826***	0.165	3.823***	0.166
111010	3.941***	0.155	3.936***	0.155
111100	3.508***	0.133	3.502***	0.134
011111	4.657***	0.146	4.655***	0.146
101111	5.048***	0.141	5.042***	0.141
110111	4.787***	0.134	4.784***	0.134
111011	4.536***	0.128	4.533***	0.128
111101	4.744***	0.128	4.742***	0.128
111110	4.584***	0.106	4.578***	0.106
111111	6.005***	0.075	6.001***	0.075
Vote Sequence × Log(Time)				
000001 × Log(Time)	-0.276***	0.049	-0.277***	0.049
000010 × Log(Time)	-0.241***	0.047	-0.242***	0.047
000100 × Log(Time)	-0.243***	0.047	-0.245***	0.047
001000 × Log(Time)	-0.190***	0.046	-0.190***	0.046
010000 × Log(Time)	-0.140***	0.042	-0.141***	0.042
100000 × Log(Time)	-0.203***	0.037	-0.205***	0.037
000011 × Log(Time)	-0.436***	0.072	-0.439***	0.072
000101 × Log(Time)	-0.598***	0.083	-0.600***	0.083
000110 × Log(Time)	-0.236**	0.073	-0.240**	0.073
001001 × Log(Time)	-0.353***	0.083	-0.355***	0.083
001010 × Log(Time)	-0.149	0.088	-0.151	0.088

001100 × Log(Time)	-0.299***	0.070	-0.301***	0.070
010001 × Log(Time)	-0.331***	0.077	-0.332***	0.077
010010 × Log(Time)	-0.189**	0.067	-0.191**	0.067
010100 × Log(Time)	-0.280***	0.076	-0.282***	0.077
011000 × Log(Time)	-0.288***	0.063	-0.288***	0.063
100001 × Log(Time)	-0.350***	0.065	-0.352***	0.065
100010 × Log(Time)	-0.388***	0.065	-0.391***	0.065
100100 × Log(Time)	-0.324***	0.060	-0.325***	0.060
101000 × Log(Time)	-0.277***	0.057	-0.277***	0.057
110000 × Log(Time)	-0.158**	0.049	-0.160**	0.049
000111 × Log(Time)	-0.533***	0.083	-0.535***	0.083
001011 × Log(Time)	-0.346***	0.098	-0.348***	0.099
001101 × Log(Time)	-0.329***	0.095	-0.332***	0.095
001110 × Log(Time)	-0.278**	0.095	-0.279**	0.095
010011 × Log(Time)	-0.403***	0.089	-0.406***	0.089
010101 × Log(Time)	-0.566***	0.115	-0.568***	0.115
010110 × Log(Time)	-0.298***	0.082	-0.299***	0.082
011001 × Log(Time)	-0.406***	0.103	-0.408***	0.103
011010 × Log(Time)	-0.389***	0.093	-0.393***	0.094
011100 × Log(Time)	-0.332***	0.078	-0.336***	0.078
100011 × Log(Time)	-0.421***	0.080	-0.422***	0.080
100101 × Log(Time)	-0.557***	0.084	-0.560***	0.084
100110 × Log(Time)	-0.508***	0.081	-0.510***	0.081
101001 × Log(Time)	-0.359***	0.080	-0.361***	0.080
101010 × Log(Time)	-0.588***	0.081	-0.589***	0.081
101100 × Log(Time)	-0.443***	0.070	-0.446***	0.070
110001 × Log(Time)	-0.567***	0.076	-0.569***	0.076
110010 × Log(Time)	-0.382***	0.071	-0.384***	0.071
110100 × Log(Time)	-0.447***	0.060	-0.449***	0.060
111000 × Log(Time)	-0.301***	0.057	-0.303***	0.057
001111 × Log(Time)	-0.664***	0.082	-0.665***	0.082
010111 × Log(Time)	-0.483***	0.090	-0.485***	0.090
011011 × Log(Time)	-0.580***	0.091	-0.582***	0.091
011101 × Log(Time)	-0.544***	0.095	-0.546***	0.095
011110 × Log(Time)	-0.384***	0.074	-0.387***	0.074
100111 × Log(Time)	-0.655***	0.076	-0.656***	0.076
101011 × Log(Time)	-0.541***	0.081	-0.542***	0.081
101101 × Log(Time)	-0.480***	0.084	-0.482***	0.085
101110 × Log(Time)	-0.564***	0.072	-0.566***	0.072
110011 × Log(Time)	-0.503***	0.075	-0.505***	0.075
110101 × Log(Time)	-0.502***	0.075	-0.503***	0.075
110110 × Log(Time)	-0.568***	0.068	-0.570***	0.068

111001 × Log(Time)	-0.480***	0.066	-0.483***	0.066
111010 × Log(Time)	-0.440***	0.062	-0.443***	0.063
111100 × Log(Time)	-0.398***	0.053	-0.400***	0.053
011111 × Log(Time)	-0.550***	0.059	-0.553***	0.059
101111 × Log(Time)	-0.708***	0.057	-0.709***	0.057
110111 × Log(Time)	-0.651***	0.054	-0.653***	0.054
111011 × Log(Time)	-0.515***	0.052	-0.518***	0.052
111101 × Log(Time)	-0.659***	0.052	-0.661***	0.052
111110 × Log(Time)	-0.572***	0.042	-0.575***	0.042
111111 × Log(Time)	-0.771***	0.030	-0.774***	0.030
Female			0.037	0.019
Single			0.083*	0.035
Native of Geneva			0.083***	0.019
Popular Vote			-0.018	0.014
Federal Level			0.058***	0.014
Cantonal Level			0.029**	0.009
Communal Level			0.011	0.010
Intercept	-6.475***	0.071	-6.637***	0.081
Var. in the Slope for Log(Time)	0.344***	0.009	0.345***	0.009
Var. in the Intercept	2.713***	0.071	2.716***	0.071
Cov. for Intercept and Log(Time)	-0.672***	0.024	-0.674***	0.024
AIC	437718		437681.2	
BIC	439189.8		439230.5	
N × T	472'585		472'585	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4.8: Multilevel Mixed-Effects Logistic Regression with Seven Vote Sequences

Dependent Variable:	*Model I*		*Model J*	
Voted *(1 = Yes, 0 = No)*	*Estimates*	*SE*	*Estimates*	*SE*
Log(Time)	0.528***	0.029	0.535***	0.029
Salience of the Vote	8.486***	0.152	8.331***	0.157
Log(Time) × Salience of the Vote	-0.571***	0.058	-0.566***	0.059
Vote Sequence				
0000001	1.915***	0.133	1.922***	0.134
0000010	1.459***	0.147	1.460***	0.147
0000100	1.464***	0.138	1.468***	0.138
0001000	1.397***	0.133	1.398***	0.133
0010000	1.408***	0.128	1.407***	0.128
0100000	1.091***	0.121	1.087***	0.121
1000000	1.172***	0.104	1.171***	0.104
0000011	2.511***	0.221	2.513***	0.222
0000101	2.704***	0.212	2.706***	0.212
0000110	2.555***	0.228	2.553***	0.228
0001001	2.069***	0.235	2.068***	0.235
0001010	2.618***	0.267	2.624***	0.267
0001100	1.927***	0.218	1.935***	0.218
0010001	2.695***	0.253	2.699***	0.253
0010010	2.415***	0.265	2.414***	0.266
0010100	1.732***	0.257	1.720***	0.258
0011000	1.951***	0.211	1.953***	0.211
0100001	2.473***	0.228	2.473***	0.228
0100010	1.892***	0.259	1.892***	0.259
0100100	2.000***	0.209	1.998***	0.209
0101000	1.945***	0.222	1.953***	0.222
0110000	2.285***	0.177	2.282***	0.178
1000001	2.365***	0.186	2.371***	0.186
1000010	2.186***	0.213	2.182***	0.213
1000100	2.288***	0.198	2.288***	0.198
1001000	1.984***	0.180	1.976***	0.180
1010000	2.130***	0.162	2.124***	0.162
1100000	1.608***	0.149	1.608***	0.149
0000111	3.635***	0.266	3.640***	0.266
0001011	3.172***	0.312	3.188***	0.312
0001101	2.990***	0.297	2.987***	0.297
0001110	2.876***	0.285	2.873***	0.286
0010011	3.671***	0.326	3.671***	0.326

0010101	2.999***	0.425	3.011***	0.426
0010110	2.542***	0.329	2.542***	0.329
0011001	3.503***	0.311	3.498***	0.311
0011010	2.545***	0.358	2.541***	0.358
0011100	2.401***	0.305	2.397***	0.305
0100011	3.253***	0.302	3.258***	0.302
0100101	2.403***	0.311	2.407***	0.311
0100110	2.650***	0.299	2.651***	0.300
0101001	2.984***	0.366	2.984***	0.366
0101010	3.203***	0.393	3.205***	0.393
0101100	2.669***	0.254	2.682***	0.254
0110001	3.091***	0.333	3.096***	0.334
0110010	2.863***	0.351	2.854***	0.351
0110100	2.714***	0.299	2.718***	0.299
0111000	2.742***	0.237	2.740***	0.238
1000011	3.475***	0.262	3.468***	0.262
1000101	3.259***	0.282	3.266***	0.282
1000110	2.993***	0.277	2.988***	0.278
1001001	3.060***	0.280	3.061***	0.280
1001010	3.610***	0.274	3.609***	0.274
1001100	2.516***	0.288	2.525***	0.288
1010001	3.187***	0.276	3.182***	0.276
1010010	3.027***	0.249	3.020***	0.249
1010100	3.323***	0.250	3.323***	0.250
1011000	3.104***	0.219	3.106***	0.219
1100001	2.843***	0.227	2.843***	0.227
1100010	2.902***	0.258	2.901***	0.259
1100100	2.809***	0.229	2.799***	0.229
1101000	2.911***	0.185	2.916***	0.185
1110000	2.544***	0.177	2.542***	0.177
0001111	3.928***	0.297	3.925***	0.297
0010111	4.575***	0.374	4.577***	0.374
0011011	3.593***	0.316	3.589***	0.316
0011101	4.243***	0.362	4.250***	0.362
0011110	3.715***	0.329	3.709***	0.329
0100111	3.594***	0.361	3.598***	0.361
0101011	4.130***	0.400	4.132***	0.401
0101101	3.282***	0.320	3.296***	0.320
0101110	3.301***	0.342	3.295***	0.342
0110011	3.196***	0.371	3.205***	0.371
0110101	3.793***	0.373	3.795***	0.373
0110110	3.088***	0.360	3.091***	0.361

0111001	3.905***	0.329	3.923***	0.329
0111010	3.997***	0.348	4.004***	0.349
0111100	3.308***	0.257	3.308***	0.257
1000111	3.819***	0.304	3.823***	0.304
1001011	4.336***	0.323	4.339***	0.323
1001101	3.981***	0.287	3.981***	0.287
1001110	3.762***	0.308	3.764***	0.308
1010011	4.278***	0.349	4.287***	0.349
1010101	4.262***	0.340	4.259***	0.341
1010110	3.343***	0.304	3.343***	0.304
1011001	3.516***	0.285	3.529***	0.285
1011010	3.640***	0.301	3.631***	0.302
1011100	3.394***	0.266	3.398***	0.267
1100011	4.054***	0.273	4.064***	0.274
1100101	3.911***	0.294	3.906***	0.294
1100110	3.808***	0.333	3.800***	0.334
1101001	3.709***	0.261	3.704***	0.261
1101010	3.416***	0.276	3.421***	0.276
1101100	3.480***	0.237	3.478***	0.237
1110001	3.651***	0.239	3.657***	0.239
1110010	3.620***	0.259	3.623***	0.259
1110100	3.360***	0.212	3.358***	0.212
1111000	3.305***	0.169	3.301***	0.169
0011111	4.621***	0.250	4.625***	0.250
0101111	4.725***	0.303	4.722***	0.303
0110111	4.812***	0.304	4.817***	0.304
0111011	4.593***	0.304	4.597***	0.304
0111101	4.125***	0.263	4.126***	0.263
0111110	3.802***	0.232	3.798***	0.232
1001111	4.341***	0.236	4.331***	0.236
1010111	4.801***	0.265	4.801***	0.266
1011011	4.163***	0.284	4.161***	0.284
1011101	4.451***	0.245	4.451***	0.245
1011110	3.961***	0.267	3.962***	0.268
1100111	4.074***	0.242	4.074***	0.242
1101011	4.550***	0.251	4.545***	0.251
1101101	4.436***	0.241	4.437***	0.241
1101110	4.224***	0.217	4.227***	0.217
1110011	3.886***	0.223	3.884***	0.223
1110101	4.583***	0.226	4.578***	0.226
1110110	3.652***	0.219	3.651***	0.219
1111001	4.233***	0.210	4.229***	0.210

1111010	4.252***	0.197	4.250***	0.197
1111100	3.789***	0.154	3.786***	0.154
0111111	5.131***	0.187	5.133***	0.187
1011111	5.192***	0.164	5.186***	0.164
1101111	5.118***	0.171	5.115***	0.171
1110111	4.734***	0.160	4.732***	0.160
1111011	5.051***	0.165	5.049***	0.165
1111101	5.249***	0.139	5.242***	0.139
1111110	5.077***	0.132	5.074***	0.132
1111111	6.171***	0.084	6.167***	0.084
0000000 × Log(Time)				
0000001 × Log(Time)	-0.311***	0.057	-0.314***	0.057
0000010 × Log(Time)	-0.196***	0.059	-0.197***	0.059
0000100 × Log(Time)	-0.174**	0.056	-0.176**	0.056
0001000 × Log(Time)	-0.202***	0.054	-0.203***	0.054
0010000 × Log(Time)	-0.196***	0.052	-0.197***	0.052
0100000 × Log(Time)	-0.103*	0.048	-0.103*	0.048
1000000 × Log(Time)	-0.137**	0.042	-0.138***	0.042
0000011 × Log(Time)	-0.230*	0.095	-0.234*	0.095
0000101 × Log(Time)	-0.299***	0.088	-0.301***	0.088
0000110 × Log(Time)	-0.319***	0.095	-0.321***	0.095
0001001 × Log(Time)	-0.276**	0.097	-0.276**	0.097
0001010 × Log(Time)	-0.460***	0.110	-0.464***	0.110
0001100 × Log(Time)	-0.170	0.094	-0.174	0.094
0010001 × Log(Time)	-0.357***	0.108	-0.358***	0.108
0010010 × Log(Time)	-0.274*	0.109	-0.276*	0.109
0010100 × Log(Time)	-0.101	0.103	-0.101	0.103
0011000 × Log(Time)	-0.204*	0.086	-0.205*	0.086
0100001 × Log(Time)	-0.299**	0.091	-0.302***	0.091
0100010 × Log(Time)	-0.144	0.103	-0.147	0.104
0100100 × Log(Time)	-0.194*	0.083	-0.196*	0.083
0101000 × Log(Time)	-0.293**	0.090	-0.296***	0.090
0110000 × Log(Time)	-0.368***	0.072	-0.369***	0.072
1000001 × Log(Time)	-0.346***	0.076	-0.350***	0.076
1000010 × Log(Time)	-0.192*	0.086	-0.193*	0.086
1000100 × Log(Time)	-0.353***	0.080	-0.356***	0.080
1001000 × Log(Time)	-0.280***	0.072	-0.280***	0.072
1010000 × Log(Time)	-0.262***	0.066	-0.262***	0.066
1100000 × Log(Time)	-0.052	0.059	-0.054	0.059
0000111 × Log(Time)	-0.479***	0.116	-0.483***	0.116
0001011 × Log(Time)	-0.635***	0.134	-0.637***	0.135
0001101 × Log(Time)	-0.290*	0.123	-0.292*	0.123

0001110 × Log(Time)	-0.440***	0.116	-0.444***	0.117
0010011 × Log(Time)	-0.475**	0.144	-0.476***	0.144
0010101 × Log(Time)	-0.218	0.188	-0.223	0.188
0010110 × Log(Time)	-0.127	0.135	-0.130	0.135
0011001 × Log(Time)	-0.606***	0.131	-0.608***	0.132
0011010 × Log(Time)	-0.206	0.147	-0.207	0.148
0011100 × Log(Time)	-0.016	0.126	-0.015	0.126
0100011 × Log(Time)	-0.446***	0.124	-0.447***	0.124
0100101 × Log(Time)	-0.047	0.123	-0.049	0.123
0100110 × Log(Time)	-0.265*	0.118	-0.269*	0.118
0101001 × Log(Time)	-0.316*	0.155	-0.317*	0.155
0101010 × Log(Time)	-0.448**	0.165	-0.452**	0.165
0101100 × Log(Time)	-0.318**	0.104	-0.319**	0.104
0110001 × Log(Time)	-0.341*	0.139	-0.338*	0.139
0110010 × Log(Time)	-0.278	0.146	-0.280	0.146
0110100 × Log(Time)	-0.290*	0.122	-0.291*	0.122
0111000 × Log(Time)	-0.275**	0.096	-0.278**	0.096
1000011 × Log(Time)	-0.495***	0.107	-0.498***	0.107
1000101 × Log(Time)	-0.447***	0.115	-0.451***	0.115
1000110 × Log(Time)	-0.353**	0.111	-0.355**	0.111
1001001 × Log(Time)	-0.416***	0.115	-0.420***	0.115
1001010 × Log(Time)	-0.647***	0.111	-0.650***	0.112
1001100 × Log(Time)	-0.249*	0.116	-0.253*	0.117
1010001 × Log(Time)	-0.418***	0.113	-0.418***	0.113
1010010 × Log(Time)	-0.316**	0.099	-0.319**	0.099
1010100 × Log(Time)	-0.569***	0.103	-0.569***	0.104
1011000 × Log(Time)	-0.535***	0.090	-0.537***	0.090
1100001 × Log(Time)	-0.321***	0.092	-0.323***	0.092
1100010 × Log(Time)	-0.432***	0.105	-0.434***	0.105
1100100 × Log(Time)	-0.289**	0.091	-0.289**	0.091
1101000 × Log(Time)	-0.424***	0.074	-0.426***	0.074
1110000 × Log(Time)	-0.198**	0.071	-0.199**	0.071
0001111 × Log(Time)	-0.561***	0.126	-0.564***	0.126
0010111 × Log(Time)	-0.724***	0.158	-0.728***	0.159
0011011 × Log(Time)	-0.270*	0.133	-0.273*	0.133
0011101 × Log(Time)	-0.717***	0.154	-0.721***	0.154
0011110 × Log(Time)	-0.478***	0.135	-0.477***	0.135
0100111 × Log(Time)	-0.515***	0.152	-0.519***	0.152
0101011 × Log(Time)	-0.656***	0.173	-0.660***	0.173
0101101 × Log(Time)	-0.242	0.138	-0.246	0.138
0101110 × Log(Time)	-0.332*	0.139	-0.335*	0.140
0110011 × Log(Time)	-0.428**	0.161	-0.431**	0.161

0110101 × Log(Time)	-0.628***	0.156	-0.633***	0.156
0110110 × Log(Time)	-0.361*	0.149	-0.363*	0.149
0111001 × Log(Time)	-0.536***	0.142	-0.543***	0.142
0111010 × Log(Time)	-0.586***	0.147	-0.591***	0.148
0111100 × Log(Time)	-0.339**	0.104	-0.343**	0.104
1000111 × Log(Time)	-0.524***	0.124	-0.527***	0.124
1001011 × Log(Time)	-0.621***	0.131	-0.625***	0.132
1001101 × Log(Time)	-0.650***	0.117	-0.652***	0.117
1001110 × Log(Time)	-0.440***	0.126	-0.444***	0.127
1010011 × Log(Time)	-0.648***	0.145	-0.651***	0.145
1010101 × Log(Time)	-0.772***	0.137	-0.774***	0.137
1010110 × Log(Time)	-0.318**	0.122	-0.321**	0.123
1011001 × Log(Time)	-0.408***	0.114	-0.411***	0.114
1011010 × Log(Time)	-0.516***	0.124	-0.518***	0.124
1011100 × Log(Time)	-0.533***	0.109	-0.534***	0.110
1100011 × Log(Time)	-0.650***	0.115	-0.654***	0.115
1100101 × Log(Time)	-0.542***	0.119	-0.547***	0.119
1100110 × Log(Time)	-0.504***	0.135	-0.508***	0.136
1101001 × Log(Time)	-0.588***	0.107	-0.592***	0.107
1101010 × Log(Time)	-0.357**	0.113	-0.361**	0.113
1101100 × Log(Time)	-0.469***	0.095	-0.471***	0.095
1110001 × Log(Time)	-0.471***	0.097	-0.474***	0.097
1110010 × Log(Time)	-0.490***	0.102	-0.494***	0.102
1110100 × Log(Time)	-0.301***	0.086	-0.303***	0.086
1111000 × Log(Time)	-0.405***	0.068	-0.407***	0.068
0011111 × Log(Time)	-0.656***	0.106	-0.658***	0.106
0101111 × Log(Time)	-0.628***	0.127	-0.630***	0.127
0110111 × Log(Time)	-0.637***	0.124	-0.638***	0.124
0111011 × Log(Time)	-0.590***	0.130	-0.592***	0.130
0111101 × Log(Time)	-0.452***	0.108	-0.456***	0.109
0111110 × Log(Time)	-0.465***	0.092	-0.468***	0.092
1001111 × Log(Time)	-0.661***	0.099	-0.660***	0.099
1010111 × Log(Time)	-0.662***	0.112	-0.664***	0.113
1011011 × Log(Time)	-0.399***	0.121	-0.403***	0.121
1011101 × Log(Time)	-0.587***	0.099	-0.592***	0.099
1011110 × Log(Time)	-0.333**	0.108	-0.335**	0.108
1100111 × Log(Time)	-0.407***	0.096	-0.409***	0.096
1101011 × Log(Time)	-0.586***	0.104	-0.586***	0.104
1101101 × Log(Time)	-0.615***	0.100	-0.618***	0.100
1101110 × Log(Time)	-0.572***	0.088	-0.574***	0.088
1110011 × Log(Time)	-0.393***	0.091	-0.396***	0.091
1110101 × Log(Time)	-0.557***	0.095	-0.560***	0.095

1110110 × Log(Time)	-0.334***	0.089	-0.338***	0.089
1111001 × Log(Time)	-0.508***	0.085	-0.510***	0.086
1111010 × Log(Time)	-0.639***	0.080	-0.642***	0.080
1111100 × Log(Time)	-0.393***	0.062	-0.395***	0.062
0111111 × Log(Time)	-0.555***	0.079	-0.558***	0.079
1011111 × Log(Time)	-0.733***	0.067	-0.734***	0.067
1101111 × Log(Time)	-0.688***	0.069	-0.690***	0.069
1110111 × Log(Time)	-0.484***	0.066	-0.487***	0.066
1111011 × Log(Time)	-0.654***	0.068	-0.657***	0.068
1111101 × Log(Time)	-0.715***	0.056	-0.719***	0.056
1111110 × Log(Time)	-0.644***	0.053	-0.647***	0.053
1111111 × Log(Time)	-0.768***	0.034	-0.770***	0.034
Female			0.006	0.020
Single			0.088*	0.035
Native of Geneva			0.081***	0.020
Popular Vote			-0.026	0.014
Federal Level			0.071***	0.014
Cantonal Level			0.037***	0.009
Communal Level			0.011	0.010
Intercept	-6.512***	0.075	-6.663***	0.084
Var. in the Slope for Log(Time)	0.354***	0.010	0.355***	0.010
Var. in the Intercept	2.647***	0.072	2.651***	0.072
Cov. for Intercept and Log(Time)	-0.681***	0.024	-0.684***	0.024
AIC	416035.8		415991.9	
BIC	418911.1		418944.2	
N × T	449'645		449'645	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

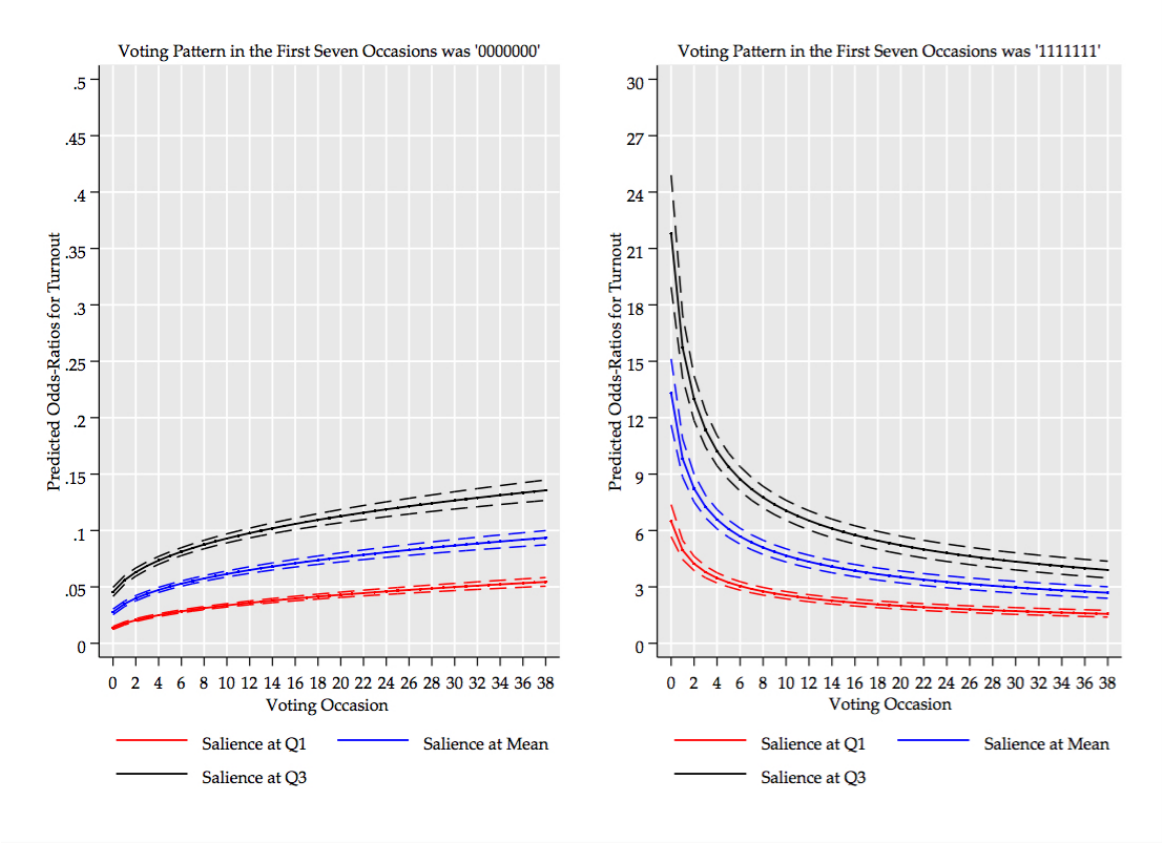

Figure 4.7: Effect of Time on Starting Levels and Growth Rates for Individuals Who Had Constant Behavior in the First Seven Voting Occasions

Table 4.9: Proximity: Multilevel Mixed-Effects Logistic Regression with Three Vote Sequences

Dependent Variable: **Voted** *(1 = Yes, 0 = No)*	*Model K* *Estimates*	*SE*	*Model L* *Estimates*	*SE*
Log(Time)	0.503***	0.030	0.519***	0.037
Salience of the Vote	8.365***	0.166	8.419***	0.181
Log(Time) × Salience of the Vote	-0.572***	0.063	-0.595***	0.070
Proximity of the Vote	0.039	0.030	-0.024	0.090
Log(Time) × Proximity of the Vote			0.025	0.034
Vote Sequence				
001	2.096***	0.075	2.097***	0.075
010	1.788***	0.073	1.789***	0.073
100	1.876***	0.065	1.876***	0.065
011	3.221***	0.081	3.221***	0.081
101	3.412***	0.075	3.412***	0.075
110	3.051***	0.069	3.051***	0.069
111	4.816***	0.059	4.817***	0.059
Vote Sequence × Log(Time)				
001 × Log(Time)	-0.303***	0.029	-0.303***	0.029
010 × Log(Time)	-0.242***	0.028	-0.242***	0.028
100 × Log(Time)	-0.281***	0.025	-0.281***	0.025
011 × Log(Time)	-0.436***	0.031	-0.436***	0.031
101 × Log(Time)	-0.520***	0.029	-0.520***	0.029
110 × Log(Time)	-0.421***	0.026	-0.421***	0.026
111 × Log(Time)	-0.685***	0.022	-0.686***	0.022
Female	0.045*	0.021	0.045*	0.021
Single	0.071	0.037	0.072	0.037
Native of Geneva	0.093***	0.021	0.093***	0.021
Popular Vote	0.000	.	0.000	.
Federal Level	0.016	0.016	0.017	0.016
Cantonal Level	0.052***	0.010	0.052***	0.010
Communal Level	-0.027*	0.011	-0.028*	0.011
Intercept	-6.211***	0.091	-6.251***	0.106
Var. in the Slope for Log(Time)	0.375***	0.011	0.375***	0.011
Var. in the Intercept	3.581***	0.094	3.580***	0.094
Cov. for Intercept and Log(Time)	-0.831***	0.029	-0.831***	0.029
AIC	388724.5		388725.9	
BIC	389029.2		389041.5	
N × T	393'058		393'058	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

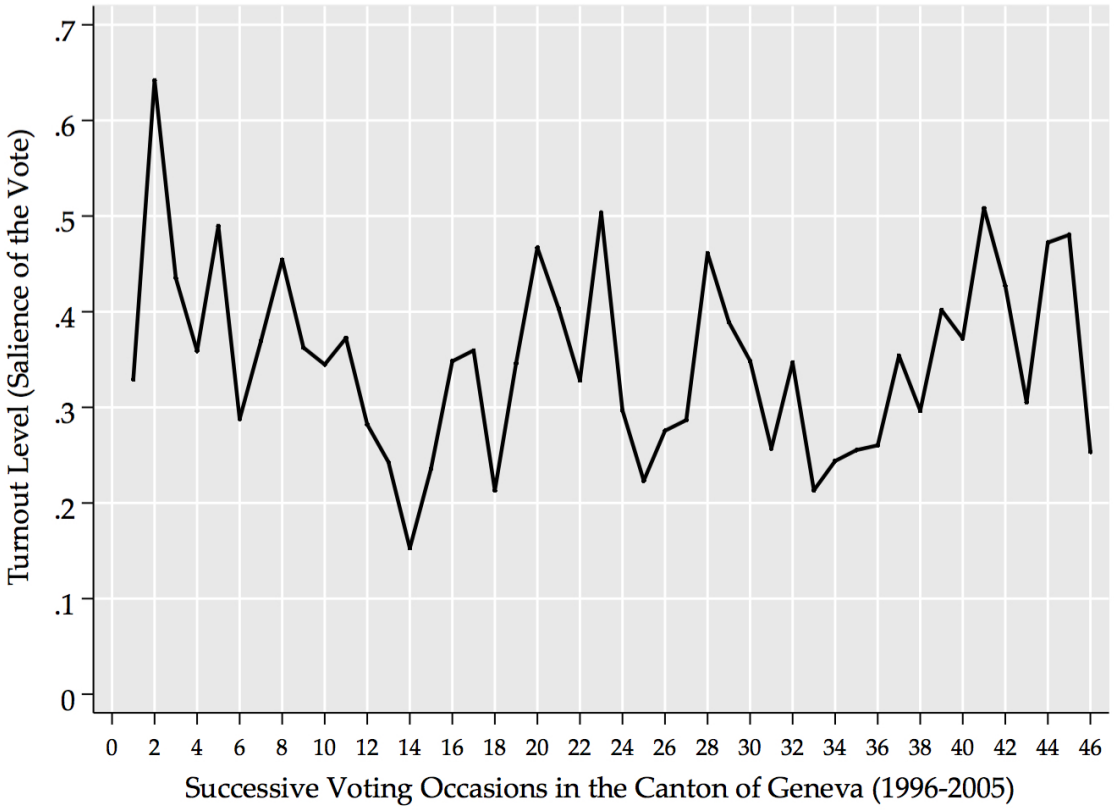

Figure 4.8: Average Turnout Level across Voting Occasions in Geneva (1996-2005)